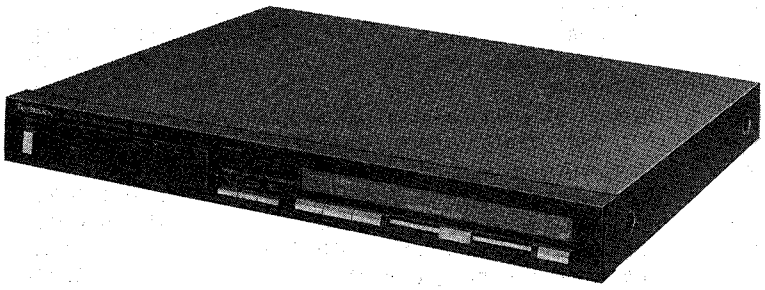
ORDER NO. SD81092040C8

Service Manual

Stereo DC Control Amplifier

SU-A8(K)

[E],[EG],[EK],[EF],[EH],
[EB],[Ei],[XA],[XL]



* The black type model is provided with (K) in the Service Manual. SU-A8(K)
* The colors of this model is black type only.

Areas

* [E] is available in Scandinavia and Switzerland.
* [EG] is available in F.R. Germany.
* [EK] is available in United Kingdom.
* [EF] is available in France.
* [EH] is available in Holland.
* [EB] is available in Belgium.
* [Ei] is available in Italy.
* [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
* [XL] is available in Australia.

English

Specifications

(Specifications are subject to change without notice for further improvement.)

(DIN 45 500)

■ AMPLIFIER SECTION

Total harmonic distortion	
PHONO MM (20 Hz~20 kHz)	0.002% (2V output at vol. −20 dB)
PHONO MC (20 Hz~15 kHz)	0.007% (2V output at vol. −20 dB)
TUNER, AUX, TAPE (20 Hz~20 kHz)	0.002% (2V output at vol. −20 dB)
Input sensitivity and impedance	
PHONO MM	2.5 mV/47kΩ
MC	170μV/220Ω
TUNER, AUX, TAPE	150 mV/22kΩ
PHONO maximum input voltage (1 kHz, RMS)	
PHONO MM	160 mV
MC	11 mV
S/N (IHF, A)	
rated output	
PHONO MM	77 dB (88 dB, IHF, '66)
MC (250μV)	71 dB (73 dB, IHF, '66)
TUNER, AUX, TAPE	93 dB (102 dB IHF, '66:)
−26 dB output	
PHONO MM	66 dB
MC (250μV)	66 dB
TUNER, AUX, TAPE	70 dB
Frequency response	
PHONO MM	RIAA standard curve ±0.2 dB
MC	RIAA standard curve ±0.5 dB
TUNER, AUX, TAPE	DC~20 kHz, +0 dB, −0.2 dB DC~100 kHz, +0 dB, −3 dB
Maximum output voltage	
PHONO MM	9V (30 Hz~15 kHz)
PHONO MC	9V (30 Hz~15 kHz)
TUNER, AUX, TAPE	10V (30 Hz~15 kHz)
Tone controls	
BASS	50 Hz, +10 dB~ −10 dB
TREBLE	20 kHz, +10 dB~ −10 dB
Subsonic filter	20 Hz, −12 dB/oct.
Loudness control (volume at −30 dB)	50 Hz, +9 dB
Output voltage and impedance	
PRE OUT	rated 1V, max. 10V/2Ω
REC OUT	150 mV/600Ω
Channel balance, 250 Hz~6,300 Hz	±1 dB
Channel separation, 1 kHz	50 dB

■ GENERAL

Power consumption	15W
Power supply	AC 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (W×H×D)	430 × 53 × 365 mm (16-15/16" × 2-3/32" × 14-3/8")
Weight	4.8 kg (10.6 lb.)

Note:
Total harmonic distortion is measured by the digital spectrum analyzer (H.P. 3045 system).

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Deutsch

TECHNISCHE DATEN (Spezifikationen Können infolge von Verbesserungen ohne Ankündigung geändert werden.)

(DIN 45 500)

■ VERSTÄRKERTEIL

Gesamtklirrfaktor
- **Phono - magnetisch (PHONO MM) (20 Hz ~ 20 kHz)** 0,002%
  (2 V Ausgangsspannung bei −20 dB Leistung)
- **Phono - dynamisch (PHONO MC) (20 Hz ~ 15 kHz)** 0,007%
  (2 V Ausgangsspannung bei −20 dB Leistung)
- **Tuner, Aux, Tape (20 Hz ~ 20 kHz)** 0,002%
  (2 V Ausgangsspannung bei −20 dB Leistung)

Eingangsempfindlichkeit und -impedanz
- **Phono - magnetisch (PHONO MM)** 2,5 mV/47 kΩ
- **Phono - dynamisch (PHONO MC)** 170 μV/220 Ω
- **Tuner, Aux, Tape** 150 mV/22 kΩ

Maximale TA-Eingangsspannung (1 kHz, eff.)
- **magnetisch (MM)** 160 mV
- **dynamisch (MC)** 11 mV

Geräuschabstand (IHF, A)
- **Nennausgang**
  - **Phono - magnetisch (PHONO MM)** 77 dB (88 dB nach IHF, '66)
  - **Phono - dynamisch (PHONO MC) (250 μV)** 71 dB (73 dB nach IHF, '66)
  - **Tuner, Aux, Tape** 93 dB (102 dB nach IHF, '66:)
- **−26 dB Ausgang**
  - **Phono - magnetisch (PHONO MM)** 66 dB
  - **Phono - dynamisch (PHONO MC) 250 μV)** 66 dB
  - **Tuner, Aux, Tape** 70 dB

Frequenzgang
- **Phono MM** RIAA-Standardkurve ±0,2 dB
- **Phono MC** RIAA-Standardkurve ±0,5 dB
- **Tuner, Aux, Tape** DC ~ 20 kHz, +0 dB, −0,2 dB
  DC ~ 100 kHz, +0 dB, −3 dB

Maximale Ausgangsspannung
- **Phono MM** 9 V (30 Hz ~ 15 kHz)
- **Phono MC** 9 V (30 Hz ~ 15 kHz)
- **Tuner Aux, Tape** 10V (30 Hz ~ 15 kHz)

Klangregler
- **Baßregler (BASS)** 50 Hz, +10 dB ~ −10 dB
- **Höhenregler (TREBLE)** 20 kHz, +10 dB ~ −10 dB

Tiefenfilter 20 Hz, −12 dB/Okt.

Gehörrichtige Lautstärkekorrektur (Loudness)
- **(bei −30 dB Ausgangsleistung)** 50 Hz, +9 dB

Ausgangsspannung und -impedanz
- **Vorverstärker (PRE OUT)** Nennspg. 1 V, Höchst. 10 V/2 Ω
- **Aufnahmeausgang (REC OUT)** 150 mV/600 Ω

Kanalabweichung (250 Hz ~ 6300 Hz) ±1 dB

Übersprechdämpfung (1 kHz) 50 dB

■ ALLGEMEINE DATEN

Leistungsaufnahme 15 W

Netzspannung
Wechselstrom 50 Hz/60 Hz, 110V/120V/220V/240V

Abmessungen (B×H×T) 430 × 53 × 365 mm

Gewicht 4,8 kg

Bemerkung:
Der Gesamtklirrfaktor wurde mit einem digitalen Rauschspektrometer (Anlage H.P. 3045) gemessen.

Español

ESPECIFICACIONES (Estas especificaciones están sujetas a cualquier cambio sin previo eviso.)

(DIN 45 500)

■ SECCION AMPLIFICADOR

Distorsión armónica total
- **TOCADISC. I.M (PHONO MM) (20 Hz~20 kHz)** 0,002%
  (2V de salida a vol. −20 dB)
- **TOCADISC. B.M (PHONO MC) (20 Hz~15 kHz)** 0,007%
  (2V de salida a vol. −20 dB)
- **SINTON., AUX., GRAB., (TUNER, AUX, TAPE) (20 Hz~20 kHz)** 0,002%
  (2V de salida a vol. −20 dB)

Sensibilidad e impedancia de entrada
- **TOCADISC. I. M. (PHONO MM)** 2,5 mV/47kΩ
- **TOCADISC. B. M. (PHONO MC)** 170 μV/220Ω
- **SINTON., AUX., GRAB. (TUNER, AUX, TAPE)** 150 mV/22kΩ

Voltaje máximo de entrada de PHONO (1 kHz, RMS)
- **TOCADISC. I.M. (PHONO MM)** 160 mV
- **TOCADISC. B. M. (MC)** 11 mV

Relación de señal a ruido (IHF, A)
- **salida de régimen**
  - **TOCADISC. I. M. (PHONO MM)** 77 dB (88 dB, IHF, '66)
  - **TOCADISC. B. M. (PHONO MC) (250 μV)** 71 dB (73 dB, IHF, '66)
  - **SINTON., AUX., GRAB. (TUNER, AUX, TAPE)** 93 dB (102 dB IHF, '66:)
- **−26 dB de salida**
  - **TOCADISC. I. M. (PHONO MM)** 66 dB
  - **TOCADISC. B. M. (PHONO MC) (250 μV)** 66 dB
  - **SINTON., AUX., GRAB. (TUNER, AUX, TAPE)** 70 dB

Nota:
La distorsión armónica total se mide con el analizador de espectro digital (sistema H.P. 3045).

Respuesta de frecuencia
- **TOCADISC. I.M. (PHONO MM)** curva RIAA estándar ±0,2 dB
- **TOCADISC. B.M (PHONO MC)** curva RIAA estándar ±0,5 dB
- **SINTON., AUX., GRAB. (TUNER, AUX, TAPE)** DC~20 kHz +0 dB, −0,2 dB
  DC~100 kHz +0 dB, −3 dB

Salida de voltaje maxima
- **TOCADISC. I.M. (PHONO MM)** 9V (30 Hz~15 kHz)
- **TOCADISC. B.M. (PHONO MC)** 9V (30 Hz~15 kHz)
- **SINTON., AUX., GRAB. (TUNER, AUX, TAPE)** 10V (30 Hz~15 kHz)

Controles de tono
- **BAJOS (BASS)** 50 Hz, +10 dB~ −10 dB
- **AGUDOS (TREBLE)** 20 kHz, +10 dB~ −10 dB

Filtro subsónico 20 Hz, −12 dB/oct.

Control de sonoridad (volumen a −30 dB) 50 Hz, +9 dB

Voltaje e impedancia de salida
- **SAL. PREAMPLIF. (PRE OUT)** de régimen 1V, máx. 10V/2Ω
- **SAL. GRAB. (REC OUT)** 150 mV/600Ω

Equilibrio de canales, 250 Hz~6 300 Hz ±1 dB

Separación de canales, 1 kHz 50 dB

■ GENERAL

Consumo de energía 15W

Alimentación de energía
CA 50 Hz/60 Hz, 110V/120V/220V/240V

Dimensiones (An.×Al.×Prof.) 430 × 53 × 365 mm

Peso 4,8 kg

ORDER NO. SD8208230088

Service Manual

Supplement

Stereo DC Control Amplifier

SU-A8(K)

[E],[EG],[EK],[EF],[EH],
[EB],[Ei],[XA],[XL]

Areas

* [E] is available in Scandinavia and Switzerland.
* [EG] is available in F.R. Germany.
* [EK] is available in United Kingdom.
* [EF] is available in France.
* [EH] is available in Holland.
* [EB] is available in Belgium.
* [Ei] is available in Italy.
* [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
* [XL] is available in Australia.

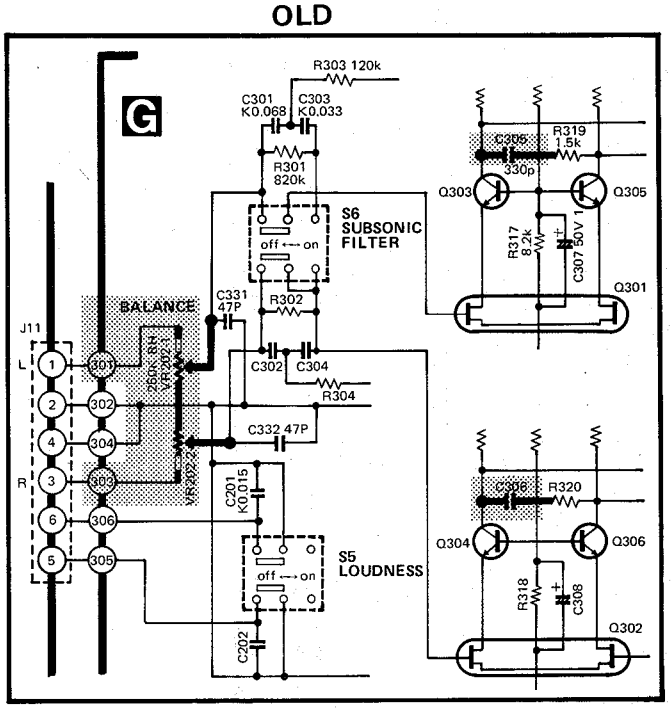
Please use this manual together with the service manual for Model No. SU-A8 (K), Order No. SD81092040C8.

■ CHANGE OF REPLACEMENT PARTS

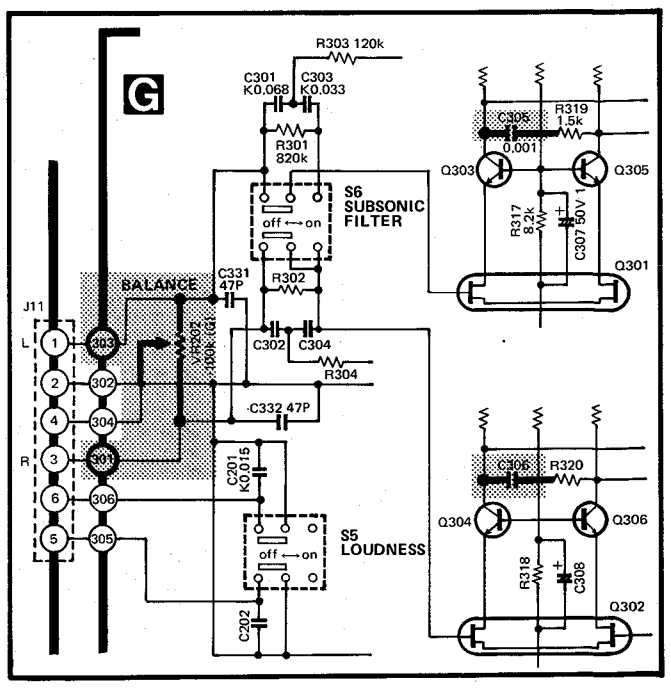
Ref. No.	Change of Part No.		Description	Remarks
	Old	New		
VR202	EVBK08C06252	EVAK16C06G15	Variable Resistor, Balance Control, 100kΩ(G)	
C305, 306	ECCD1H331KB	ECKD1H102KB	Capacitor, 0.001μF, 50V	

■ CHANGE OF SCHEMATIC DIAGRAM (Tone control circuit)

OLD



NEW



Technics

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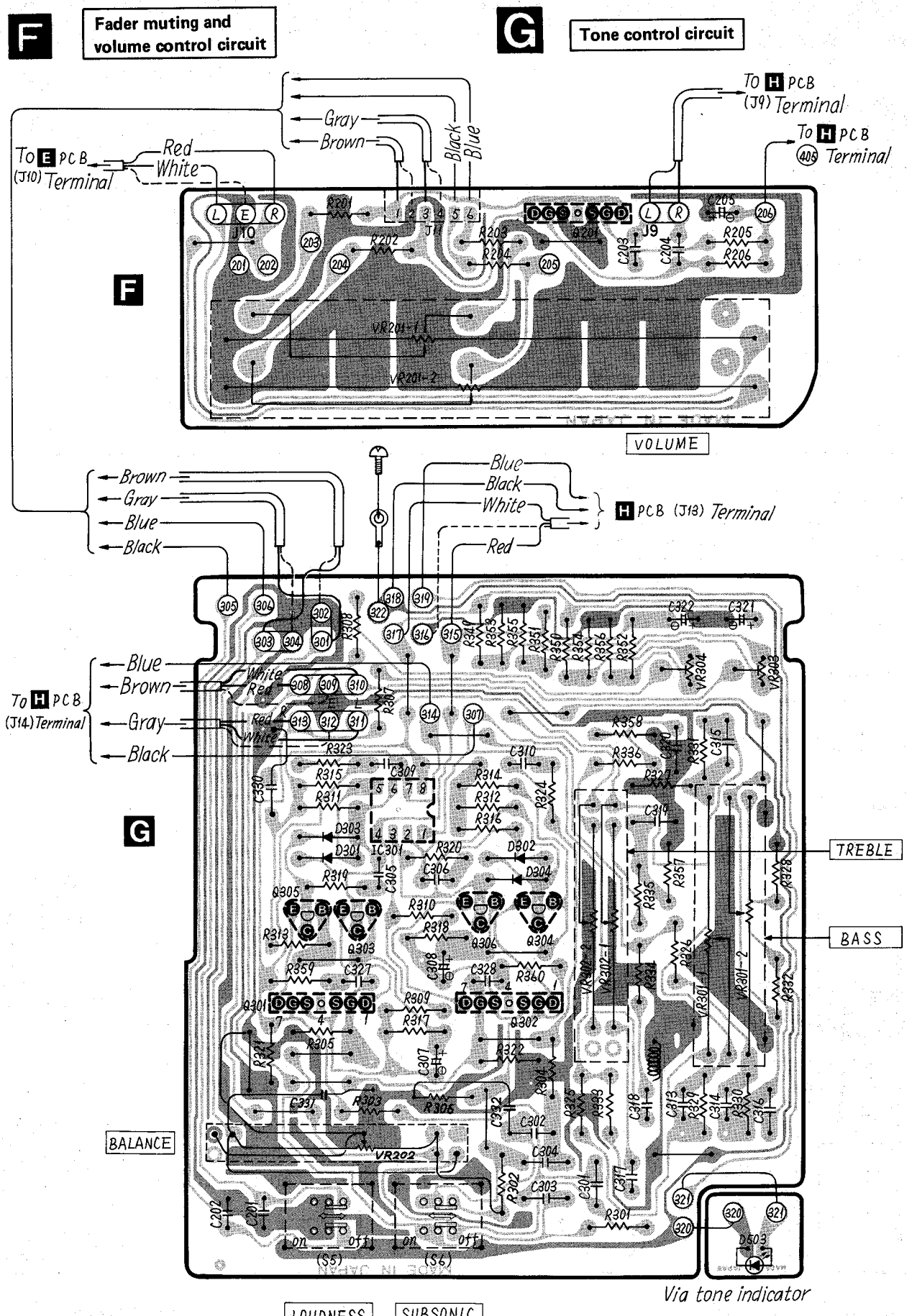
■ PRINTED CIRCUIT BOARD WIRING VIEW OF NEW TONE CONTROL CIRCUIT (Page 22)



Printed in Japan
82088000 ® KK

Français

CARACTERISTIQUES (Sujet à changement sans preavis.)
(DIN 45 500)

■ SECTION AMPLIFICATEUR

Distorsion harmonique totale
- **PHONO, AIMANT MOBILE (PHONO MM) (20 Hz~20 kHz)** 0,002% (sortie de 2 V à vol. −20 dB)
- **PHONO, BOBINE MOBILE (PHONO MC) (20 Hz~15 kHz)** 0,007% (sortie de 2 V à vol. −20 dB)
- **SYNTONISATEUR, AUX, BANDE (TUNER, AUX, TAPE) (20 Hz~20 kHz)** 0,002% (sortie de 2 V à vol. −20 dB)

Sensibilité et impédance d'entrée
- **PHONO, AIMANT MOBILE (PHONO MM)** 2,5 mV/47kΩ
- **PHONO, BOBINE MOBILE (PHONO MC)** 170 μV/220Ω
- **SYNTONISATEUR, AUX (TUNER, AUX)** 150 mV/22kΩ

PHONO (tension d'entrée maximum, 1 kHz RMS)
- **AIMANT MOBILE (MM)** 160 mV
- **BOBINE MOBILE (MC)** 11 mV

Signal/Bruit (IHF, A)
- **sortie nominale**
  - **PHONO, AIMANT MOBILE (PHONO MM)** 77 dB (88 dB, IHF, '66)
  - **PHONO, BOBINE MOBILE (PHONO MC) (250 μV)** 71 dB (73 dB, IHF, '66)
  - **SYNTONISATEUR, AUX, BANDE (TUNER, AUX, TAPE)** 93 dB (102 dB IHF, '66:)
- **sortie de −26 dB**
  - **PHONO, AIMANT MOBILE (PHONO MM)** 66 dB
  - **PHONO, BOBINE MOBILE (PHONO MC) (250 μV)** 66 dB
  - **SYNTONISATEUR, AUX, BANDE (TUNER, AUX, TAPE)** 70 dB

Réponse de fréquence
- **PHONO MM** Courbe nominale RIAA ±0,2 dB
- **PHONO MC** Courbe nominale RIAA ±0,5 dB
- **SYNTONISATEUR, AUX, BANDE (TUNER, AUX, TAPE)** DC~20 kHz, +0 dB, −0,2 dB; DC~100 kHz, +0 dB, −3 dB

Tension de sortie maximum
- **PHONO MM** 9V (30 Hz~15 kHz)
- **PHONO MC** 9V (30 Hz~15 kHz)
- **TUNER, AUX, TAPE** 10V (30 Hz~15 kHz)

Réglage de la tonalité
- **BASSES (BASS)** 50 Hz, +10 dB~ −10 dB
- **AIGUS (TREBLE)** 20 kHz, +10 dB~ −10 dB

Filtre subsonique 20 Hz, −12 dB/oct.

Compensateur physiologique (volume à −30 dB) 50 Hz, +9 dB

Tension de sortie et impédance
- **PREAMPLI (PRE OUT)** nominale 1V, max. 10V/2Ω
- **SORTIE ENREGISTREMENT (REC OUT)** 150 mV/600Ω

Equilibrage des canaux, 250 Hz~6 300 Hz ±1 dB

Séparation des canaux, 1 kHz 50 dB

■ DIVERS

Consommation 15W

Alimentation CA 50 Hz/60 Hz, 110V/120V/220V/240V

Dimensions (L×H×Pr) 430 × 53 × 365 mm

Poids 4,8 kg

Remarque:
On mesure la distorsion harmonique totale au moyen d'un analyseur de spectre digital (Système HP. 3045).

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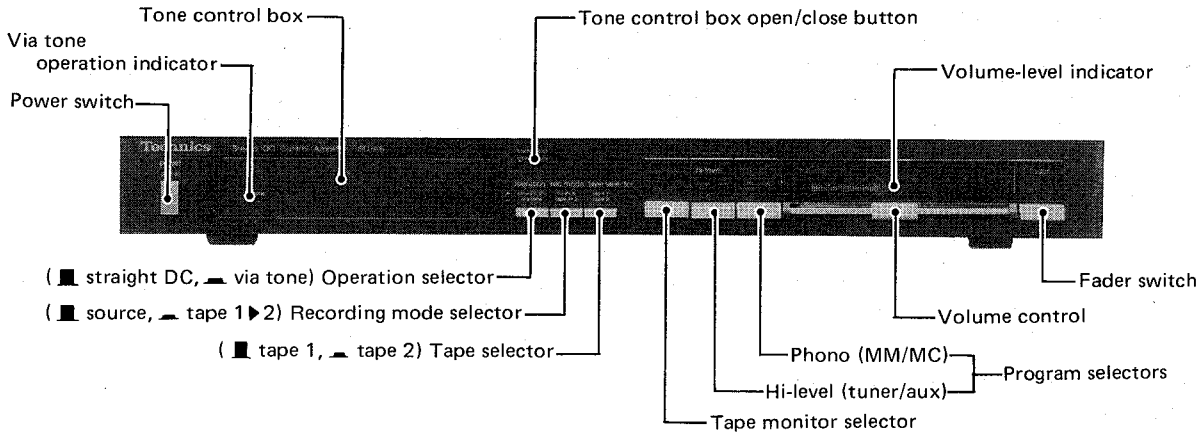
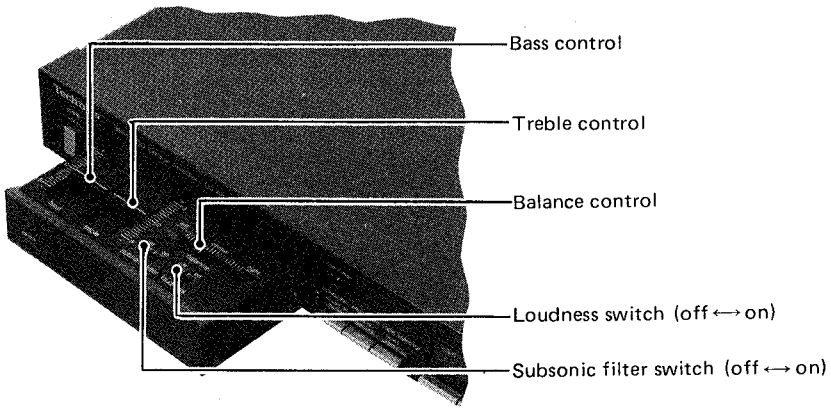
■ BEFORE REPAIR AND ADJUSTMENT

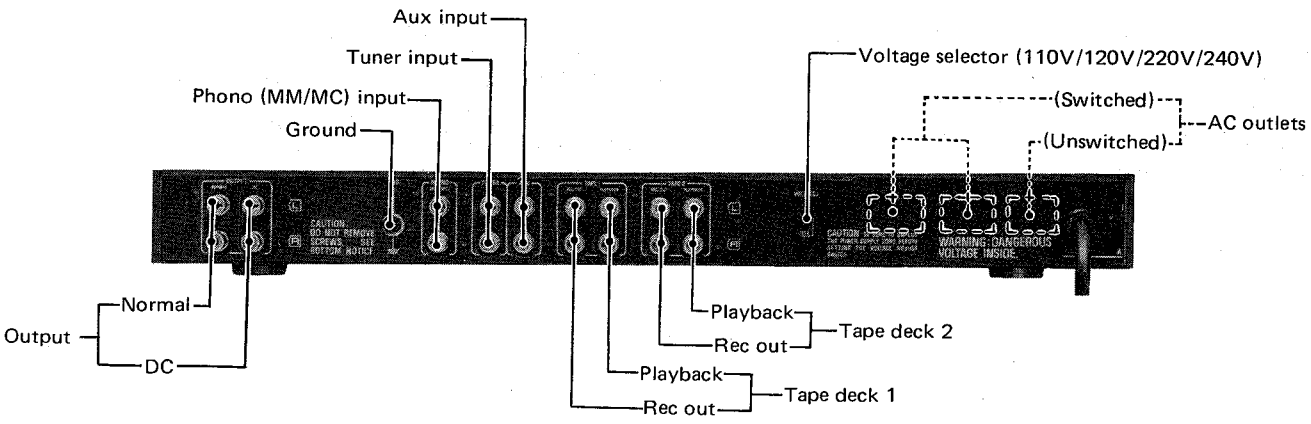
Before turning on the power supply after completion of repair, slowly apply the primary voltage by using a voltage regulator to make sure that the current consumed is free of abnormality. The current consumed at 60Hz/50Hz in no-signal mode is shown below with respect to supply voltage 110V/120V/220V/240V.

Power supply voltage		AC 110V	AC 120V	AC 220V	AC 240V
Current consumed	50Hz	95 ~ 190 mA	90 ~ 180mA	50 ~ 100 mA	40 ~ 85mA
	60Hz	90 ~ 185mA	85 ~ 170 mA	45 ~ 90 mA	40 ~ 85mA

■ LOCATION OF CONTROLS

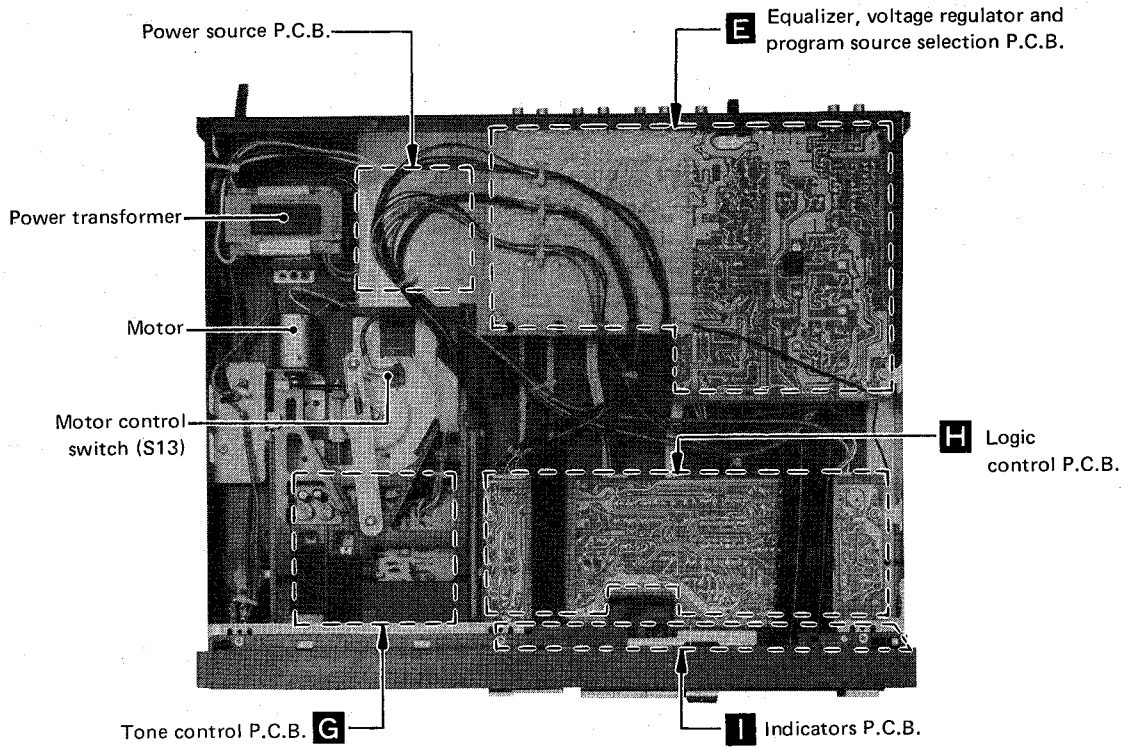




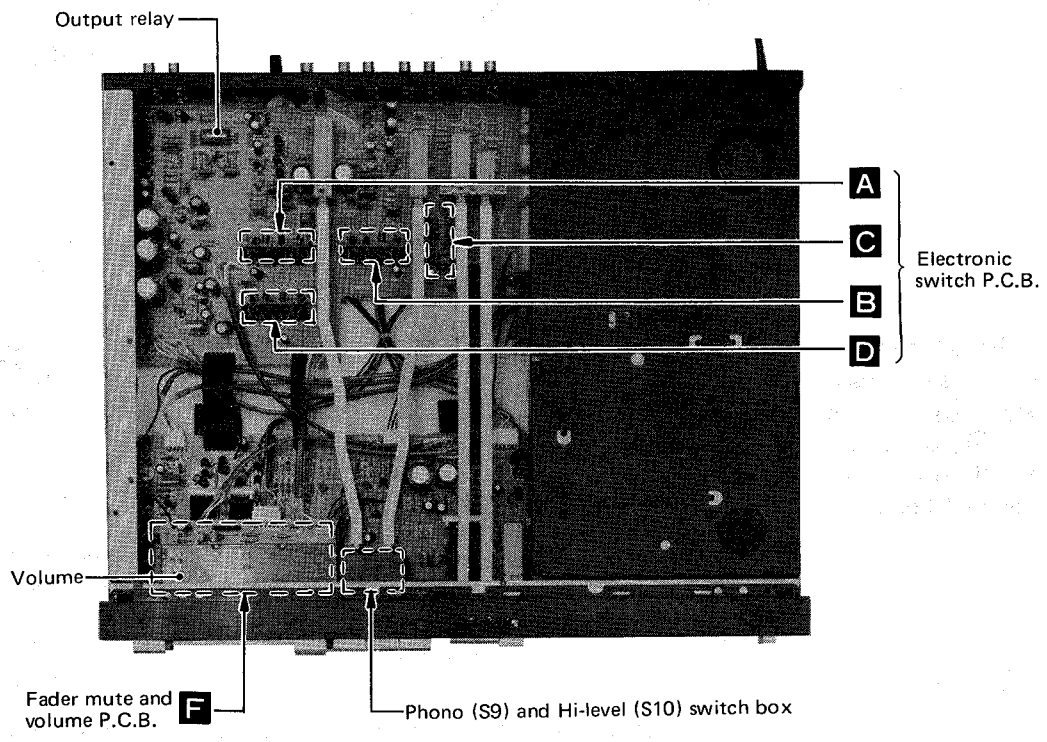


*** The product for destination [XA] is equipped with AC outlets.**

• Top view



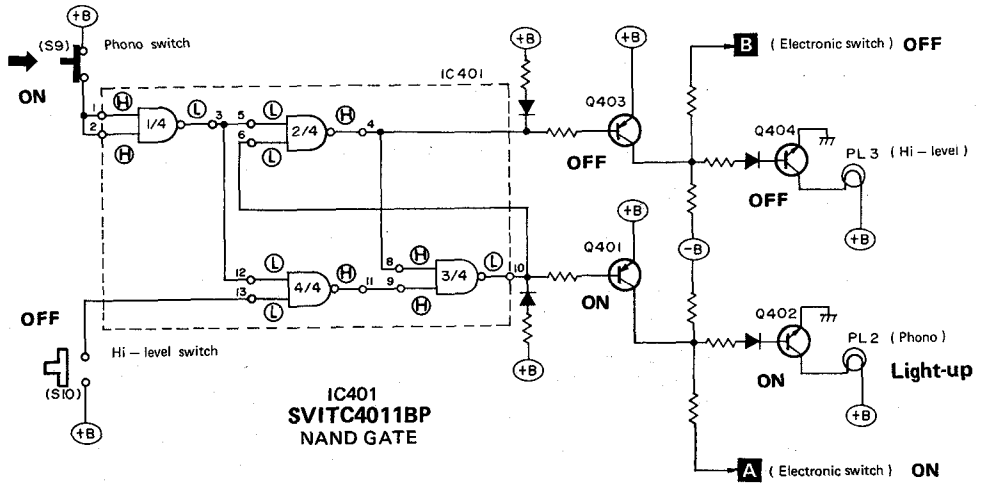
• Bottom view



■ TECHNICAL GUIDE

1. Phono and Hi-level switches

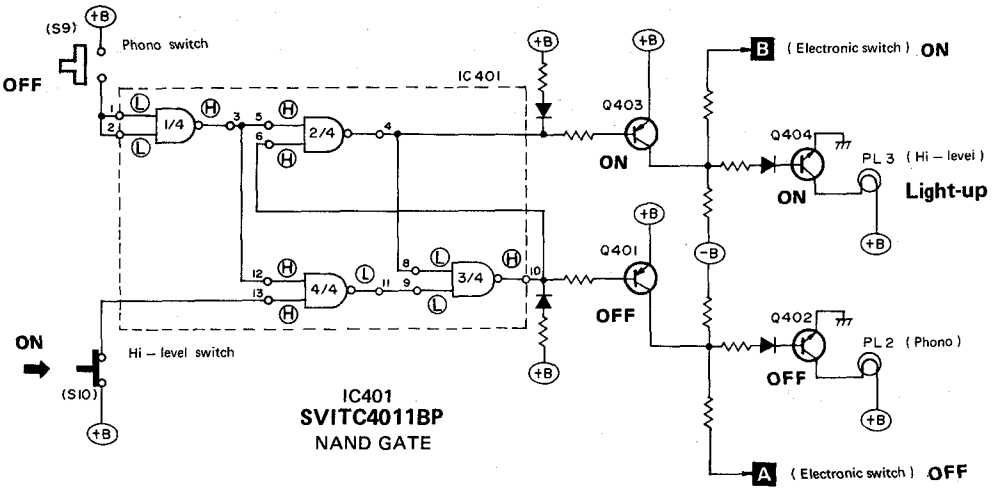
(1) When the "phono" button is pressed, **A** switch turns ON, and **B**, OFF. (See Fig. 1.)



(When the "phono" button is pressed)

Fig. 1

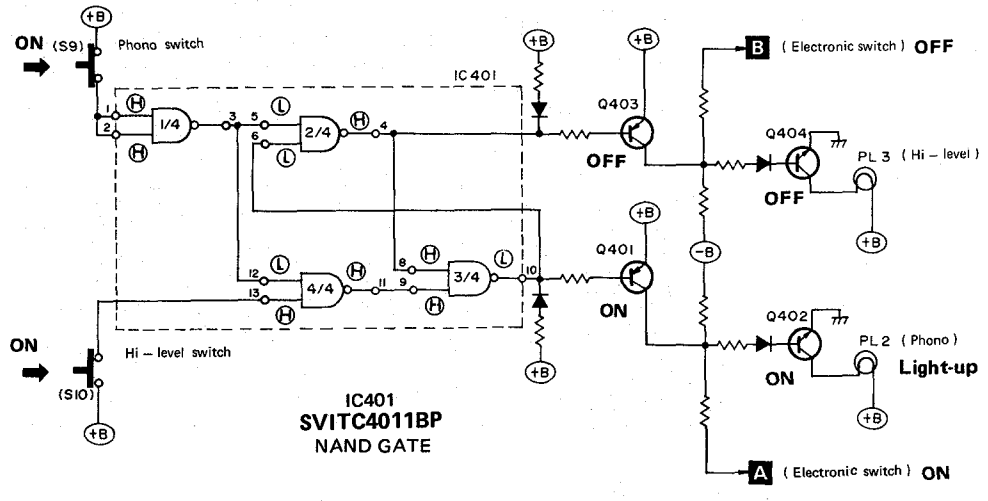
(2) When the "hi-level" button is pressed, **A** switch turns OFF, and **B**, ON. (See Fig. 2.)



(When the "hi-level" button is pressed)

Fig. 2

(3) When the "phono" and the "hi-level" buttons are pressed simultaneously, **A** switch turns ON, and **B**, OFF. (See Fig. 3.) That is, the operational priority is given to "phono".



(When the "phono" and "hi-level" buttons are pressed at the same time, the operational priority is given to the "phono")

Fig. 3

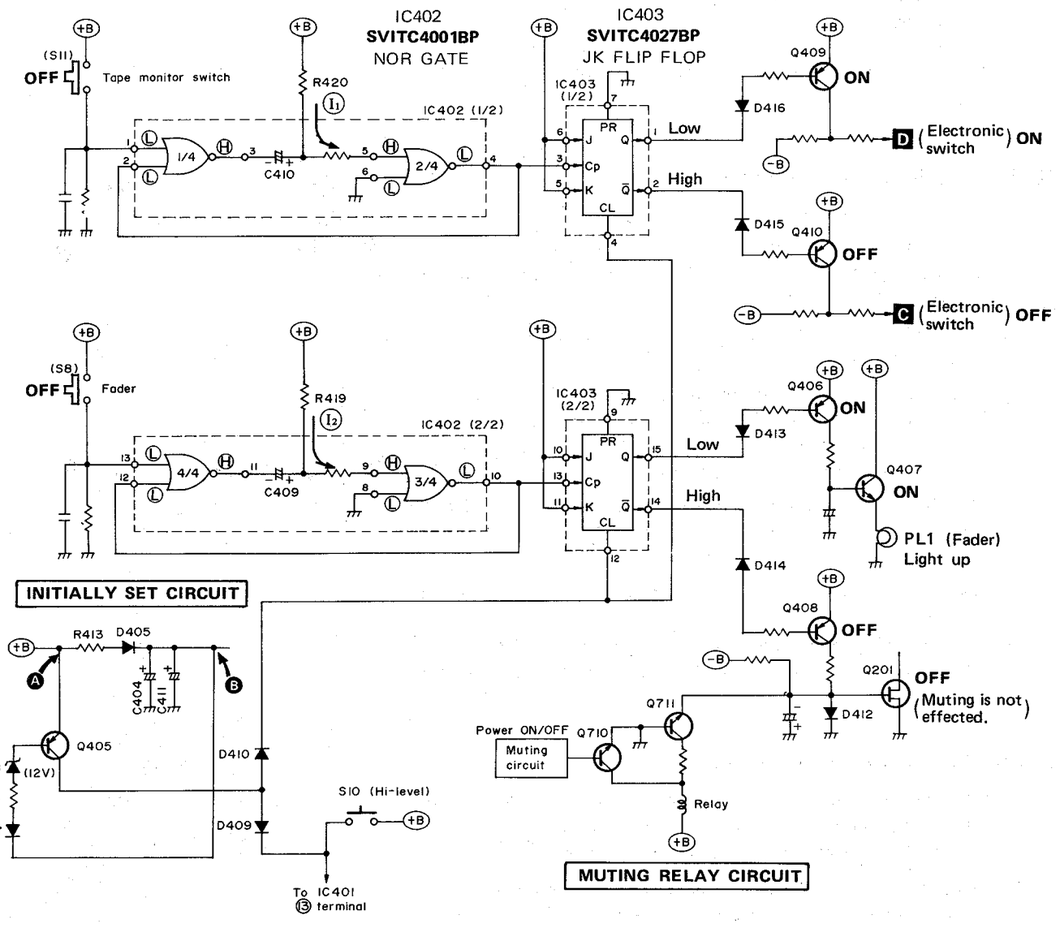
2. Tape monitor and fader switches

(1) When neither "tape monitor" nor "fader" button is pressed, the circuit is as shown in Fig. 4 where **C** switch is OFF, **D** switch, ON, and FET for muting is not operating. (Since C409 and C410 are sufficiently charged, current (I_1) and (I_2) flow in the direction of the arrow.)

(2) When the button is pressed, input of IC402 momentarily becomes "high", causing current (I_1) and (I_2) to flow as shown in Fig. 5. Soon, the current flows in the original direction, but the output of flipflop IC remains as shown in Fig. 5. The time required for directional change of (I_1) and (I_2) depends on R420 and C410 (or R419 or C409). This circuit configuration is intended to prevent faulty operation of the electronic switch due to chattering.

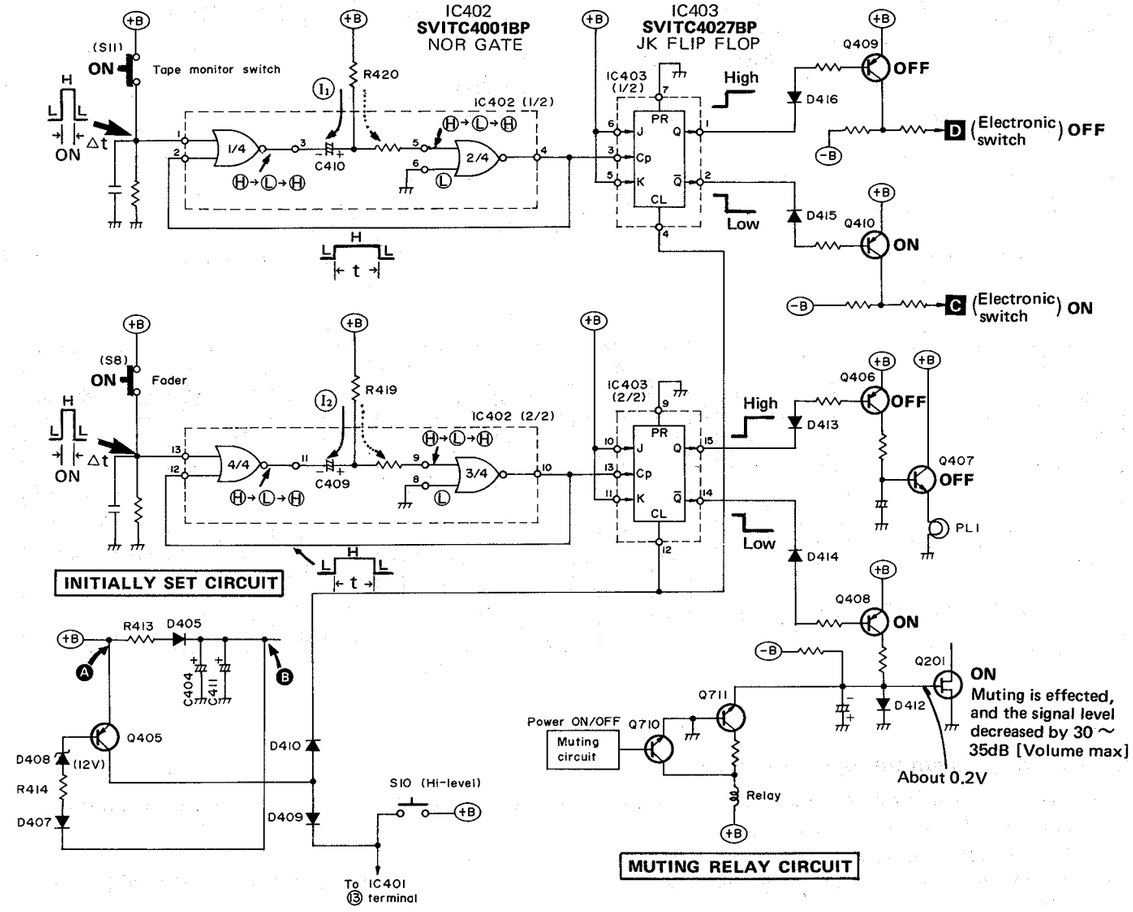
3. Muting relay and fader FET circuits

When the power switch is set to ON, no sound is made for a few seconds. This is because the muting circuit is operating. When the muting circuit operates to turn the relay ON, then fader FET turns OFF 2 or 3 seconds later. And then the sound is produced.



(When neither "tape monitor" nor "fader" button is pressed.)

Fig. 4



(When the "tape monitor" and the "fader" buttons are pressed)

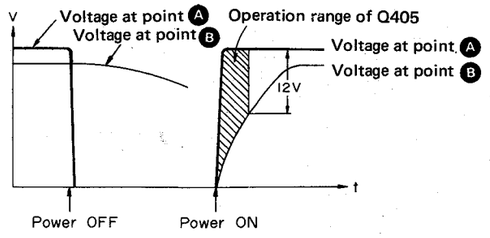
Fig. 5

4. Initially set circuit

(1) Since the unit uses an electronic switch to change over the input, it is necessary to store the conditions attained just before turning off the power switch.
The backup circuit consisting of D405, C404 and C411, shown in Fig. 4, is provided for this purpose. This circuit is able to maintain the condition attained just before turning off the power switch for 3 ~ 5 days. In the case of unattended recording of the Hi-level input of tuner or aux terminal, the Hi-level button is pushed before turning off the power switch. But if back-up power is exhausted as more than a week has passed, then the Hi-level circuit does not function even with the power switch turned ON. In that case, the "initially set circuit" serves to make the Hi-level circuit to function.

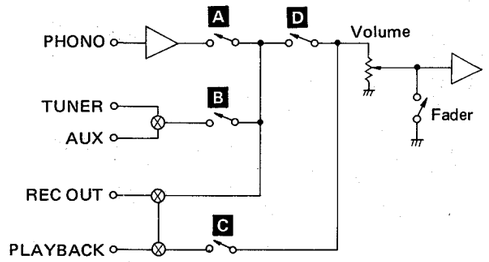
(2) When the power switch turns ON, the voltage immediately rises at point **A** of the "initially set circuit", while it takes time for the rise of voltage at point **B**. During that time, Q405 turns ON, causing the collector potential to increase. The voltage is applied to the Hi-level switch S10, making the circuit the same as shown in Fig. 2. On the other hand, the voltage is also applied to the IC403 clear terminal of the flipflop. When the clear terminal changes to "high", the output becomes "low" regardless of other input, thus making the circuit as shown in Fig. 4.

(3) The base voltage of Q405 rises as C404 and C411 are charged. Q405 turns OFF when potential difference between points **A** and **B** becomes less than 12 V (Zener voltage of D408).



(Voltage of initially set circuit)

Fig. 6



(Block diagram of input circuit)

Fig. 7

Operation \ IC No. / Pin No.	IC401 ①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	IC403 ①	②	⑭	⑮	Electronic switch A	B	C	D	Q201 (Muting)
"Phono" ON	H	H	L	H	L	L	0V	H	H	L	H	L	L	15.5V	–	–	–	–	ON	OFF	OFF	ON	–
"Hi-level" ON	L	L	H	L	H	H	0V	L	L	H	L	H	H	15.5V	–	–	–	–	OFF	ON	OFF	ON	–
	IC402																						
"Fader" and "Tape monitor" OFF	L	L	H	L	H	L	0V	L	H	L	H	L	L	15.5V	L	H	H	L	ON or OFF	ON or OFF	OFF	ON	OFF
"Fader" and "Tape monitor" ON	H	H	L	H	L	L	0V	L	L	H	L	H	H	15.5V	H	L	L	H	ON or OFF	ON or OFF	ON	OFF	ON

5. Motor drive circuit for tone control box

- The motor drive circuit is shown in Fig. 8. When the "open/close" switch (S12) is set to "ON", current I_1 flows due to voltage "Δt", causing Q501 to turn ON.
- As Q501 turns ON, I_2 flows to turn Q502 ON.
- As Q502 turns ON, I_3 flows to maintain Q501 ON, and the duration is determined by the time constant of C503 and R505.
- Due to the operation, voltage "t" is applied to Q503, causing Q503 to be kept ON for the length of time "t". Then the motor starts revolving.
- Before start of motor operation, switch (S13) is OFF as in Fig. 6. When the motor starts operating, S13 is shifted to a state as shown in Fig. 10. Even when Q503 turns OFF, S13 is kept ON so that the motor continues operating.
- When the gear is rotated by half, S13 is shifted back to the original state as in Fig. 9 where the switch is OFF causing the motor to stop.

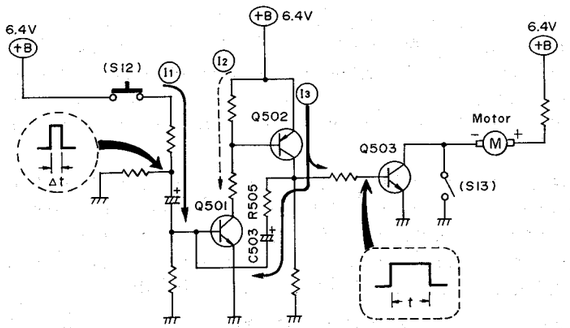


Fig. 8

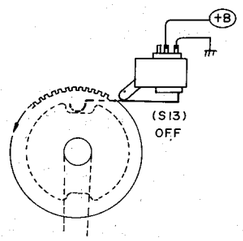


Fig. 9

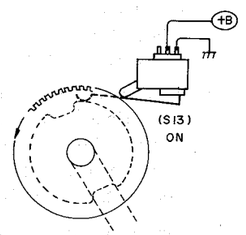


Fig. 10

■ DISASSEMBLY INSTRUCTIONS

1. How to remove the cabinet and front panel

(Fig. 10)

(1) Remove the cabinet setscrews ❶ ~ ❹ to remove the cabinet.

(2) Remove the front panel setscrews ❺ ~ ❿ to remove the front panel.

* Products for Australia are provided with ϕ3 toothed lock washers for screws ❽ and ❿ . Also, screw ❸ is provided with ϕ4 toothed lock washer.

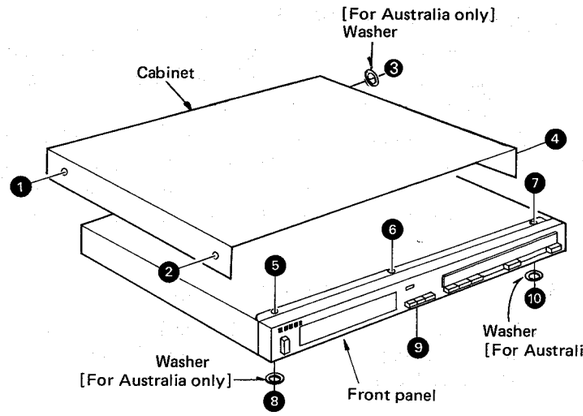


Fig. 10

2. How to remove the bottom board (Fig. 11)

(1) Remove the bottom board setscrews ❾ ~ ⓰ to remove the bottom board.

(2) The front panel setscrews also serve as setscrews ❾ and ❿ .

*When mounting the bottom board, insert the bottom board front under the chassis as shown in Fig. 12.

3. How to remove the tone control box

(1) Remove the cabinet.

(2) As shown in Fig. 13, cut off the lead clamper (Part No. SHR301) which clamps the leads J11, J13 and J14 led from the control circuit.

(3) As in Fig. 13, remove .circlip ring and detach the link rod from the tone control box.

(4) Turn over the set and draw out the tone control box as shown in Fig. 14. Then remove setscrew ⓱ to detach the cover.

*When installing the cover, fit the cover front projection into the front groove of the control box as shown in Fig. 14.

(5) The via tone indicator LED cover is glued to the front of tone control box. Pull out the P.C.B. from the LED cover, holding the lug, in the direction of the arrow shown in Fig. 15.

(6) Push the lug of tone control box in the direction shown in Fig. 16 to remove the P.C.B.

*When installing, match the pin of the tone control box with the pin hole of P.C.B. Also, match the control volume position with each knob position.

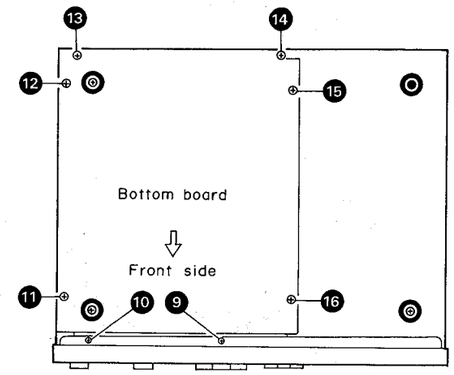


Fig. 11

4. How to match the knob positions

(1) When mounting the tone control P.C.B. after its removal, set the bass, treble and balance control volume to the positions shown in Fig. 16, and also set the position of each knob as in Fig. 16.

(2) When mounting the front panel after its removal, bring the volume control (VR201) position to the left or right side end as shown in Fig. 17, and also match the knob attached to the front panel with the volume position.

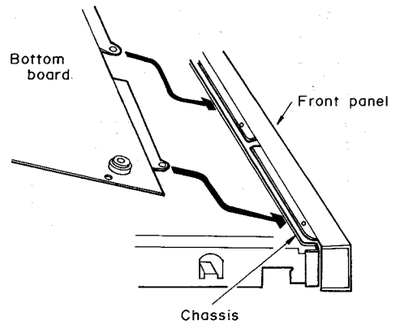


Fig. 12

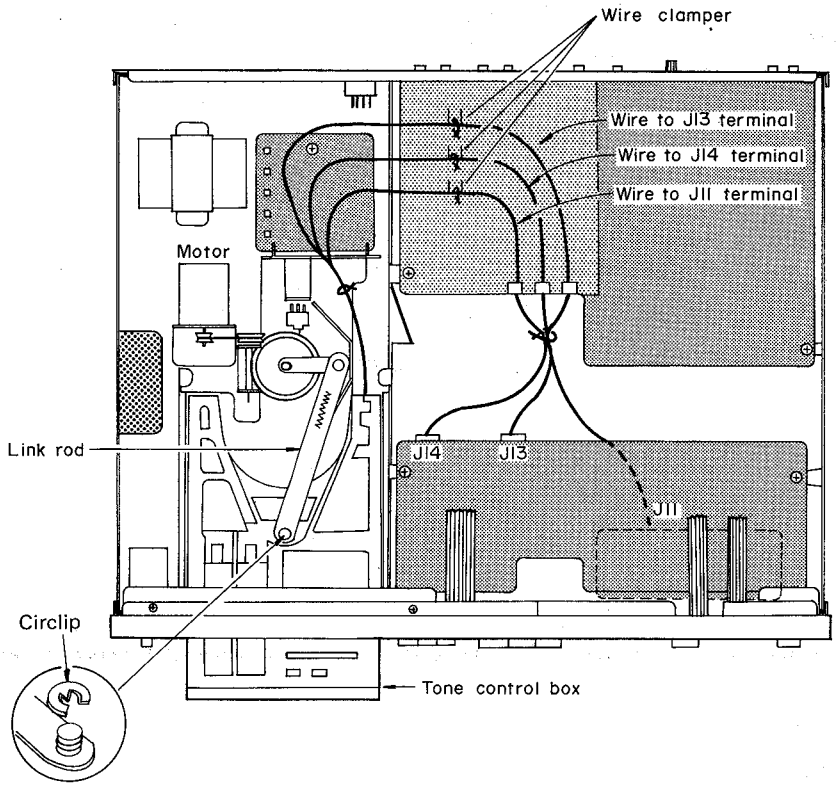


Fig. 13

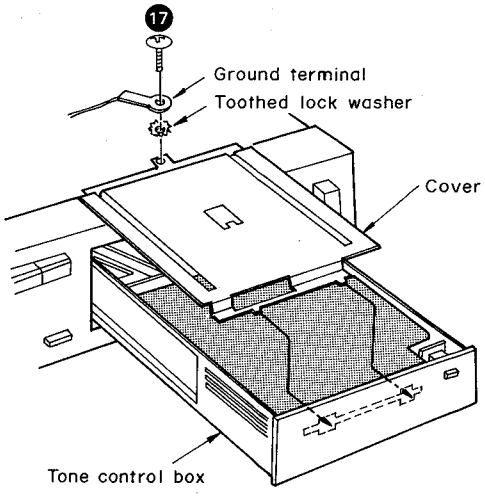


Fig. 14

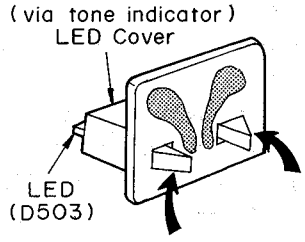


Fig. 15

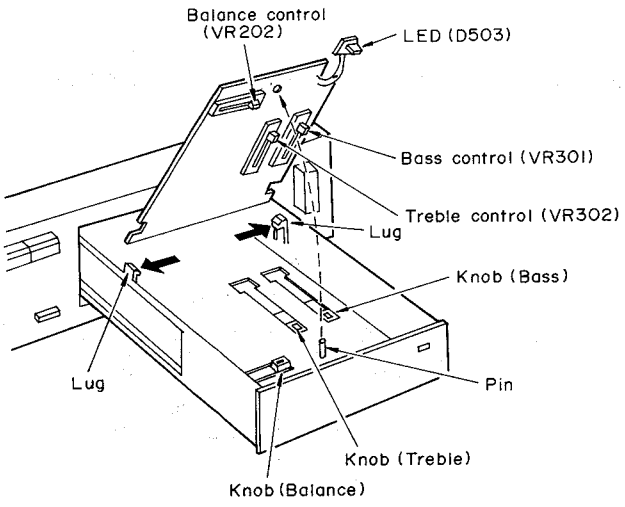


Fig. 16

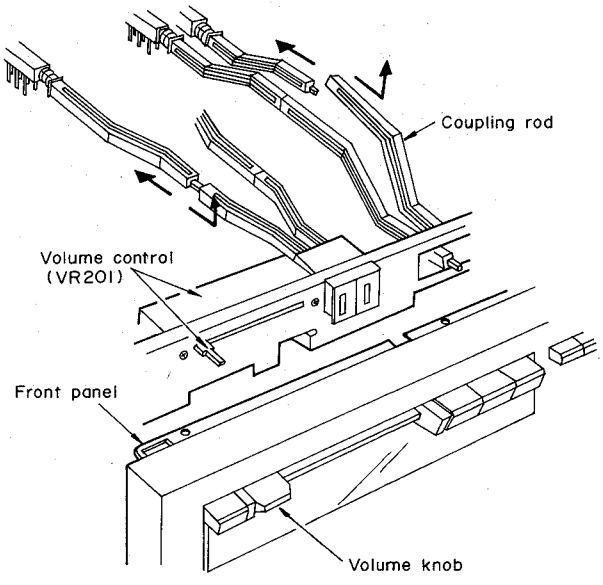


Fig. 17

5. How to remove the switch and button coupling rod

(1) When removing the coupling rod for the purpose of switch replacement or logic circuit repair, pull the rod as shown in Fig. 17 with the switch depressed and the button most projected (maximum stroke).

6. Volume indicator film

- Connect the volume indicator film as shown in Fig. 18.
- When replacing the lamps, first remove the front panel, then remove the volume indicator film and the printed circuit board of lamps.

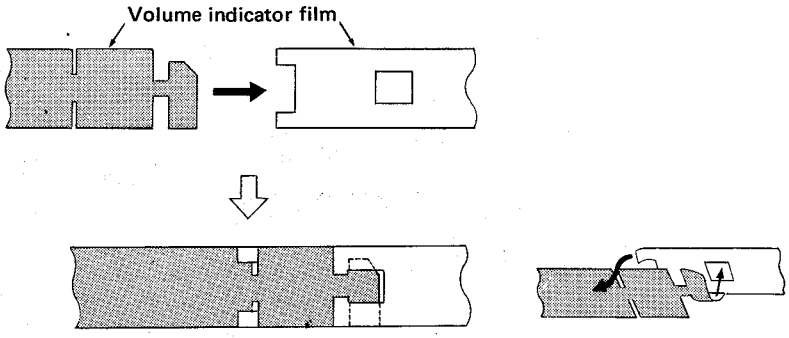


Fig. 18

■ ADJUSTMENT ——— English

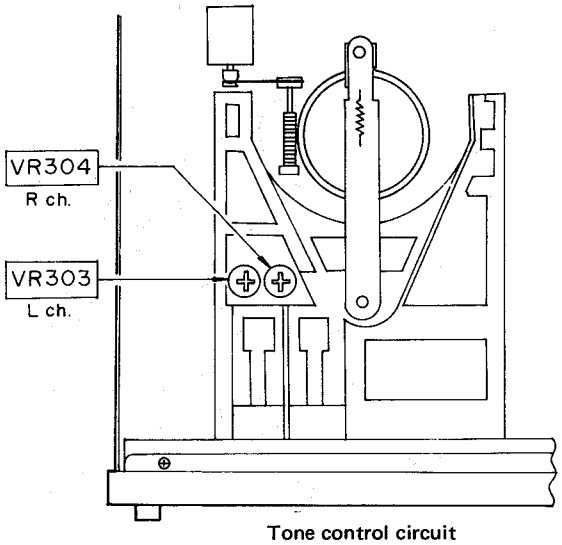
1. Setting of controls and instruments to be used.

* Operation selector . . . . . straight DC
* Program selector . . . . . phono (MM)
* Volume control . . . . . minimum
* Fader switch . . . . . off
* DC voltmeter . . . . . Capable to measure 10mV

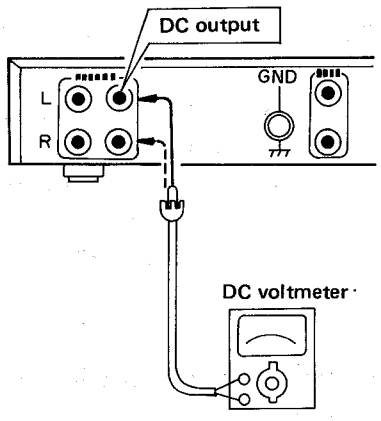
2. DC balance adjustment of tone control circuit

(1) Connect the DC voltmeter to "DC output" terminals.

(2) Adjust VR303 (L ch.) and VR304 (R ch.) to obtain a minimum reading, using the 10mV range on the DC voltmeter in about 30 seconds after power supply ON.



Tone control circuit



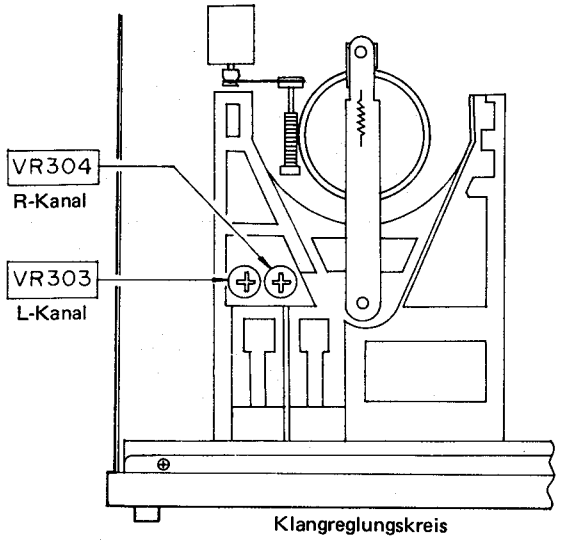
■ EINSTELLUNG — Deutsch

1. Reglerstellungen und zu verwendene Instrumente:

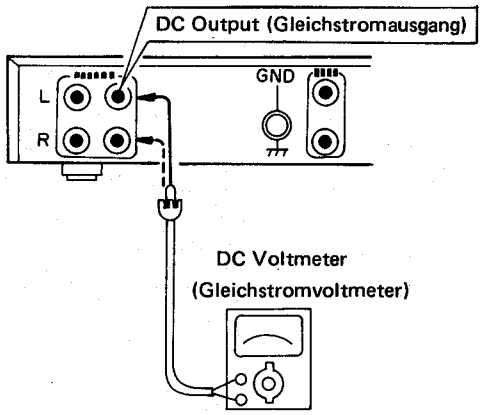
* Betriebswähler (Operation) . . . . . Gleichstrom(Straight DC)
* Programmwähler . . . . . Phono (MM)
* Lautstärkeregler (Volume) . . . . . Minimalstellung
* Überblendschalter (Fader) . . . . . Ausstellung (off)
* Gleichstromvoltmeter . . . . . Meßbereich über 10mV

2. Gleichstrom-(DC)-Balanceeinstellung des Klangreglungskreises

(1) Das Gleichstromvoltmeter an die "DC output"-Buchsen anschließen.
(2) Die Drehregler VR303 (L-Kanal) und VR304 (R-Kanal) auf Maximalwerte auf dem 10 mV-Bereich des Gleichstromvoltmeters während ungefähr 30 Sekunden nach dem Zuleiten der Stromversorgung des Gerätes einstellen.



Klangreglungskreis



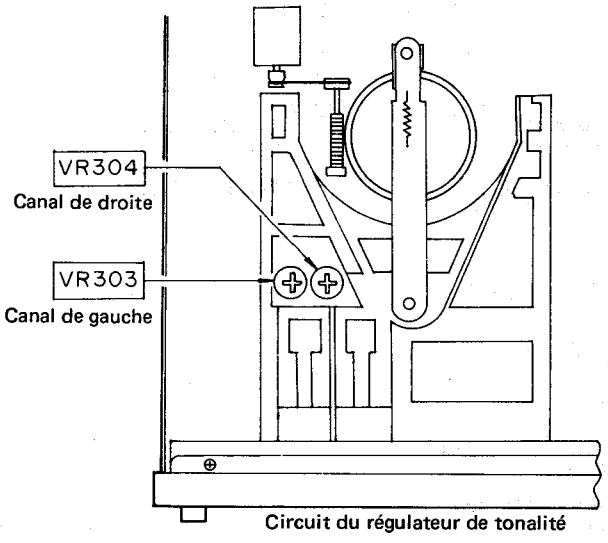
■ MISES AU POINT — Français

1. Réglage des commandes et des appareils à utiliser.

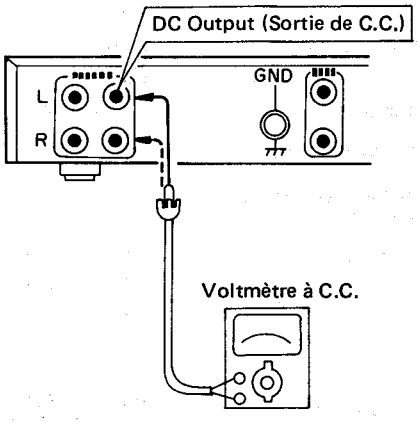
* Sélecteur d'opération (Operation) . . . . . C.C. normal (Straight DC)
* Sélecteur de programmes . . . . . phono (MM)
* Réglage du volume (Volume) . . . . . minimum
* Interrupteur d'évanouissement (Fader) . . . . . hors circuit (off)
* Voltmètre C.C. . . . . Capable de mesurer 10mV

2. Réglage de l'équilibre C.C. du circuit du régulateur de tonalité.

(1) Brancher le voltmètre à C.C. aux bornes de "sortie C.C.".
(2) Régler VR303 (canal de gauche) et VR304 (canal de droite) pour obtenir une lecture minimale, en utilisant la plage de 10mV sur le voltmètre à C.C., durant à peu près 30 secondes après avoir mis en marche l'alimentation en courant.



Circuit du régulateur de tonalité



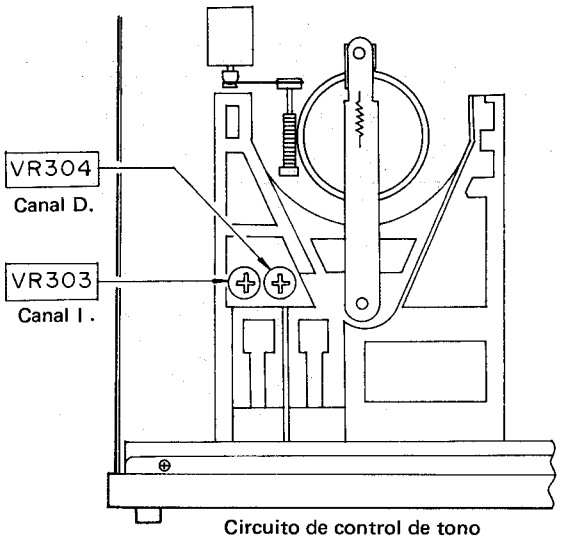
■ AJUSTE — Español

1. Puesta de controles e instrumentos a usarse

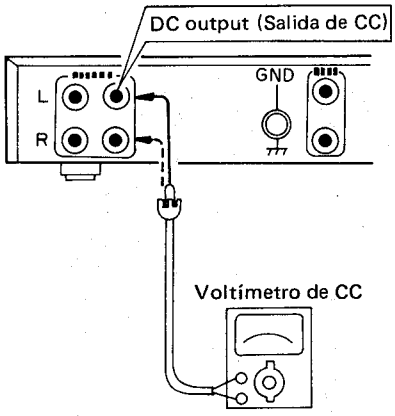
* Selector de operación (Operation) . . . . . CC recta (Straight DC)
* Selector de programa . . . . . Fono (Phono) (MM)
* Control de volumen (Volume) . . . . . Mínimo
* Interruptor desvanecedor (Fader) . . . . . off (desconectado)
* Voltímetro de CC . . . . . Capaz de medir 10mV

2. Ajuste de equilibrio de CC de circuito de control de tono

(1) Conectar el voltímetro de CC a terminales de "salida de CC"
(2) Ajustar VR303 (canal I.) y VR304 (canal D.) para obtener una lectura mínima, usando la gama 10mV del voltímetro de CC, durante unos 30 segundos después que la fuente de alimentación está en ON.



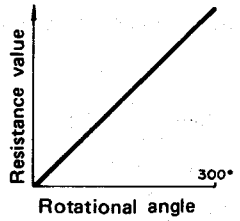
Circuito de control de tono



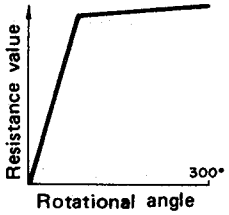
■ VARIABLE RESISTORS

● Alteration of resistance values according to the rotational angles of variable resistors

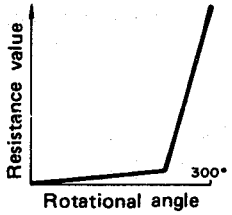
Alteration characteristics as shown below are often used for sets. All are intended to keep the frenquency response of the set at optimum levels, and are used according to the types of circuits. For example, characteristic (B) is used for sound volume adjustment; (A) and (C) are for bass and treble sound quality adjustment; and (BH) and (G) are for the adjustment of sound balance between the right and left.
In the case of this unit, variable resistor with characteristic (C) which is short-circuited between its ends at center is used for bass adjustment. Also, variable resistor with characteristic (C) whose resistance is open at center is used for treble adjustment. And characteristic (BH) in which two variable resistors are interlocked with characteristics (C) and (A) combined is used for the adjustment of sound level balance.



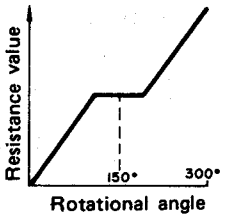
Characteristic (B)



Characteristic (C)

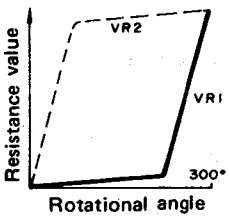


Characteristic (A)

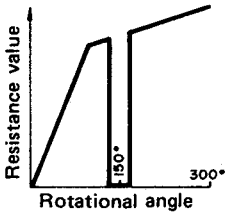


Characteristic (G)

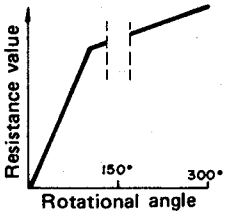
VR1 is inter locked with VR2



Characteristic (BH)

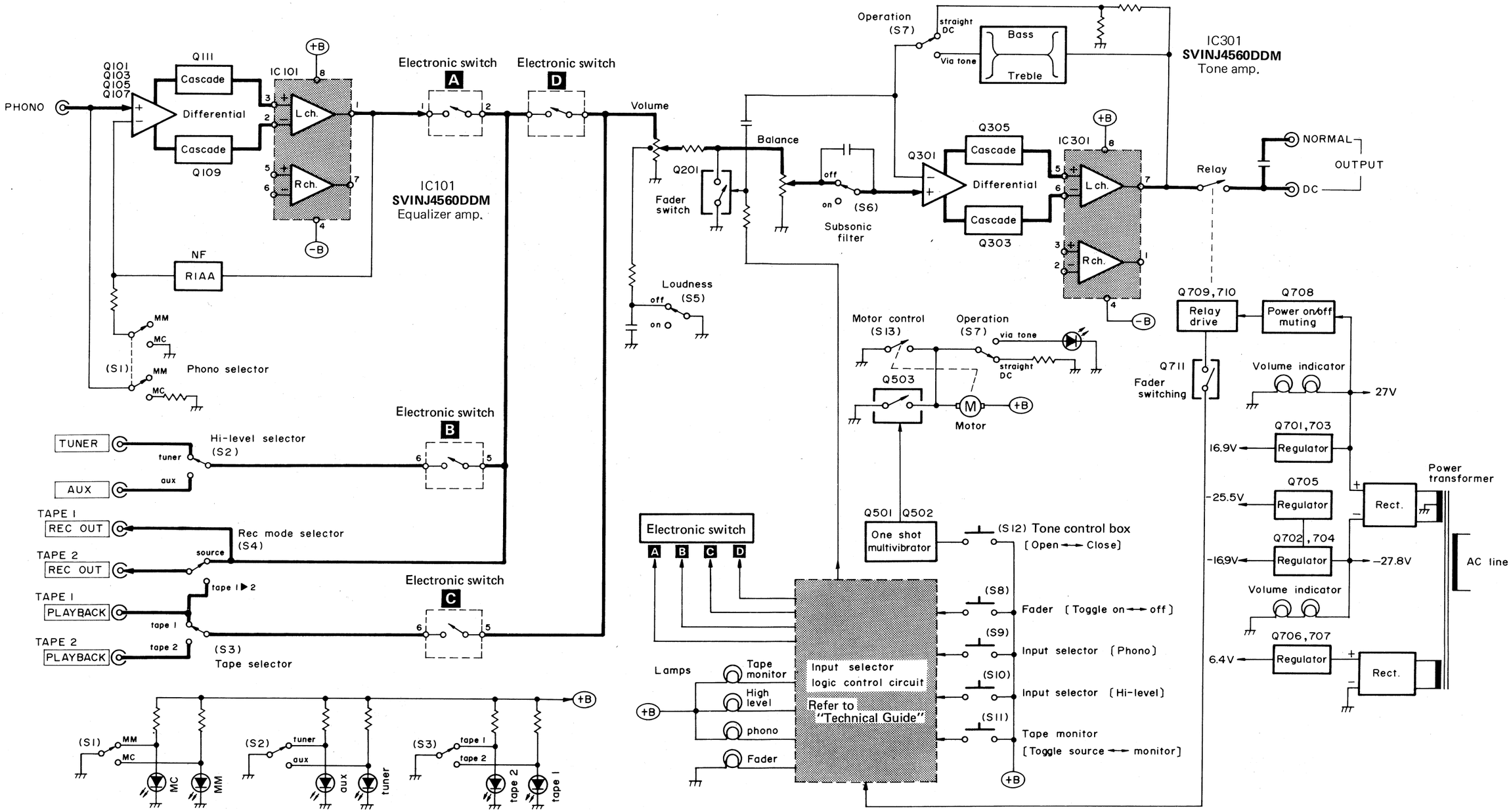


Characteristic (C): short-circuited at center



Characteristic (C): opened at center

■ BLOCK DIAGRAM



Notes:

* When the input switch on the tape monitor switch is slightly pressed, voltage is applied to each of the electronic switches **A**, **B**, **C** and **D** (analog switch using FET) from the logic control circuit, thus forming a circuit in accordance with the instruction.

Button \ Electronic switch	A	B	C	D
"Phono" is pushed.	ON	OFF	OFF	ON
"Hi-level" is pushed.	OFF	ON	OFF	ON
"Tape monitor"is pushed.	ON or OFF	OFF or ON	ON	OFF

* Input selector switch buttons (S9, S1 and S10, S2) are of double-action mechanism.
For example, when the "phono" button is slightly pushed, S9 turns ON and the electronic switch is operated by the logic control circuit. When the button is further pressed, S1 is switched from MM to MC (or from MC to MM).

* For the function of the logic control circuit, refer to the "Technical Guide" on page 6.

■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM

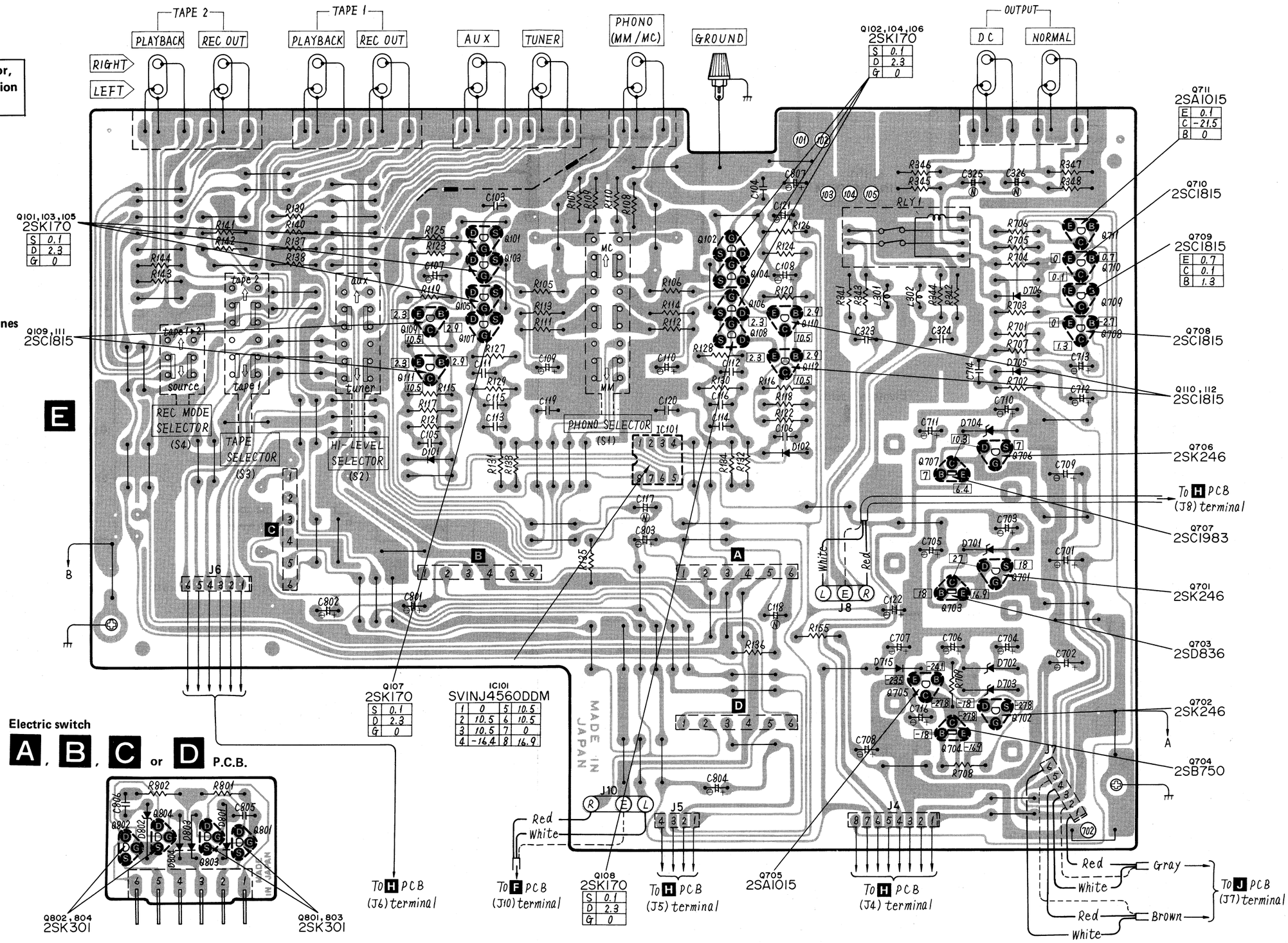
E

Equalizer, voltage regulator, and program source selection circuit

A ~ D

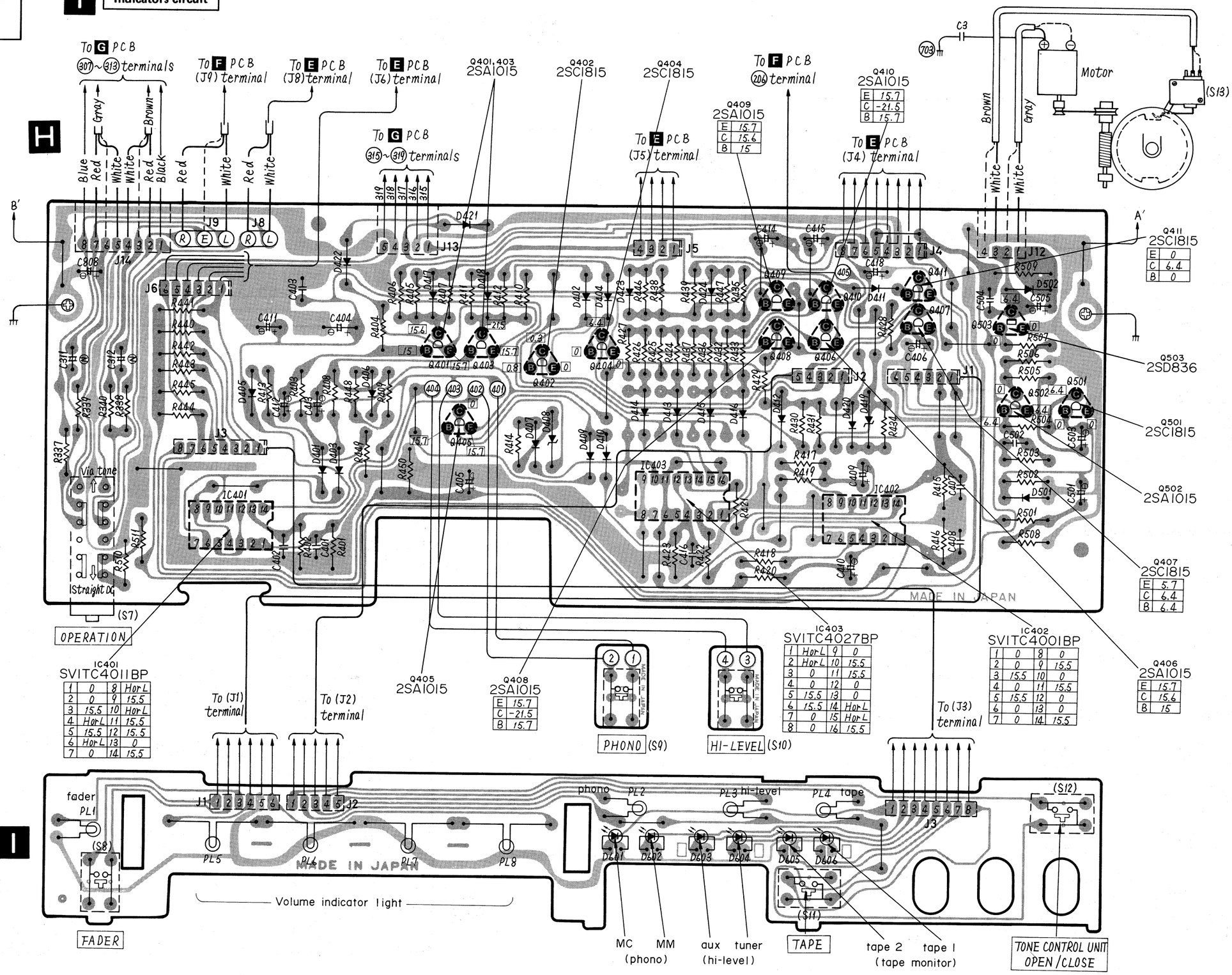
Electronic switch circuit

Ground (Earth) Lines

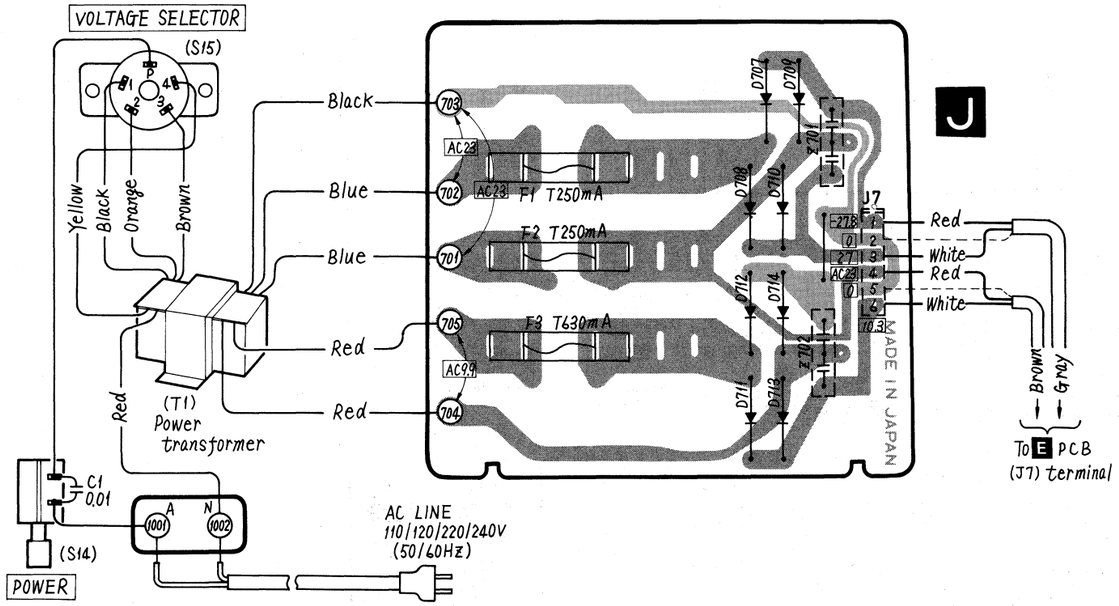


H Program selection logic control circuit

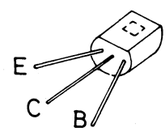
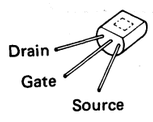
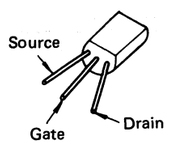
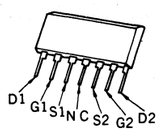
I Indicators circuit



J Power source circuit



• Terminal guide of diodes, transistors and IC's

2SA1015, 2SC1815	2SK170, 2SK301	2SK246	2SK109
			
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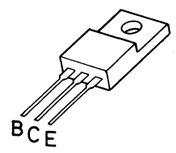	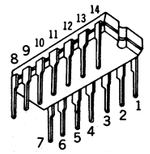	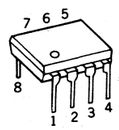	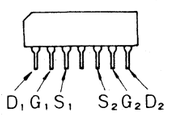
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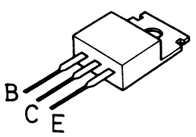
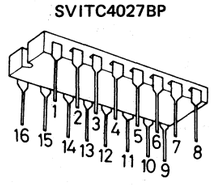
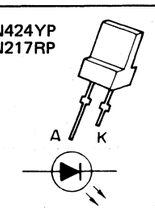
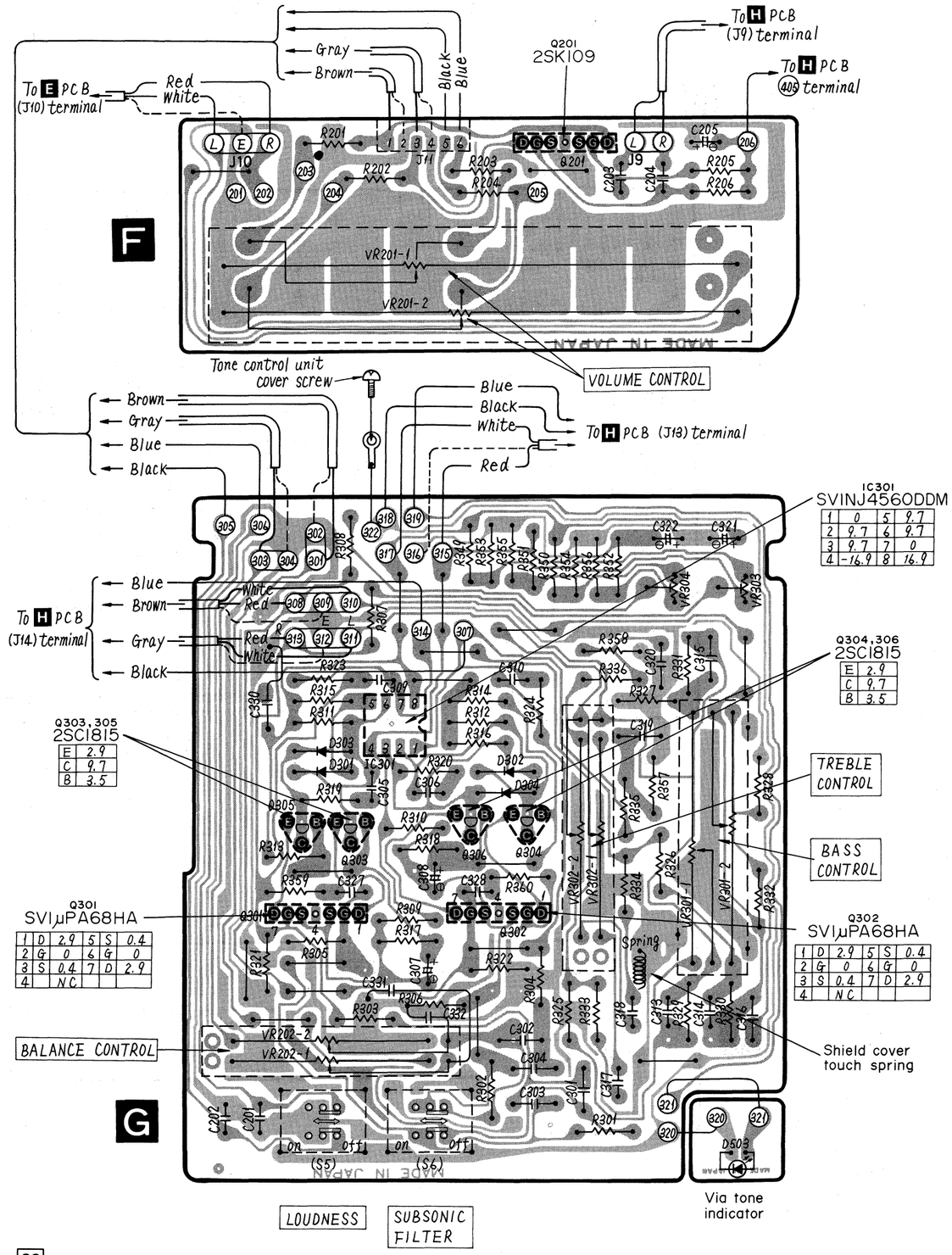
			

F Fader muting and volume control circuit

G Tone control circuit



■ RESISTORS AND CAPACITORS

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

Ref. No.		Part No.	Part Name & Description			
RESISTORS						
R105, 106		**ERD25FJ220**	Carbon,	1/4W,	22Ω,	±5%
R107, 108		**ERD25TJ473**	Carbon,	1/4W,	47kΩ,	±5%
R109, 110		**ERD25FJ221**	Carbon,	1/4W,	220Ω,	±5%
R111, 112		**ERD25FJ8R2**	Carbon,	1/4W,	8.2Ω,	±5%
R113, 114		ERO25CKF1200	Metal Film,	1/4W,	120Ω,	±1%
R115, 116		ERO25CKF1501	Metal Film,	1/4W,	1.5kΩ,	±1%
R117, 118		ERO25CKF1501	Metal Film,	1/4W,	1.5kΩ,	±1%
R119, 120		**ERD25TJ333**	Carbon,	1/4W,	33kΩ,	±5%
R121, 122		**ERD25FJ101**	Carbon,	1/4W,	100Ω,	±5%
R123, 124		**ERD25FJ822**	Carbon,	1/4W,	8.2kΩ,	±5%
R125, 126		ERO25CKF1801	Metal Film,	1/4W,	1.8kΩ,	±1%
R127, 128		**ERO25CKF6802**	Metal Film,	1/4W,	68kΩ,	±1%
R129, 130		**ERO25CKF5601**	Metal Film,	1/4W,	5.6kΩ,	±1%
R131, 132		**ERD25FJ121**	Carbon,	1/4W,	120Ω,	±5%
R133, 134		**ERD25FJ561**	Carbon,	1/4W,	560Ω,	±5%
R135, 136		**ERD25TJ473**	Carbon,	1/4W,	47kΩ,	±5%
R137, 138		**ERD25TJ473**	Carbon,	1/4W,	47kΩ,	±5%
R139, 140		**ERD25TJ473**	Carbon,	1/4W,	47kΩ,	±5%
R141, 142		**ERD25TJ473**	Carbon,	1/4W,	47kΩ,	±5%
R143, 144		**ERD25TJ473**	Carbon,	1/4W,	47kΩ,	±5%

Ref. No.		Part No.	Part Name & Description			
R155		**ERD25FJ220**	Carbon,	1/4W,	22Ω,	±5%
R201, 202		**ERD25FJ222**	Carbon,	1/4W,	2.2kΩ,	±5%
R203, 204		**ERD25TJ183**	Carbon,	1/4W	18kΩ,	±5%
R205, 206		**ERD25TJ104**	Carbon,	1/4W,	100kΩ,	±5%
R301, 302		**ERD25TJ824**	Carbon,	1/4W,	820kΩ,	±5%
R303, 304		**ERD25TJ124**	Carbon,	1/4W,	120kΩ,	±5%
R305, 306		**ERD25TJ224**	Carbon,	1/4W,	220kΩ,	±5%
R307, 308		**ERD25TJ104**	Carbon,	1/4W,	100kΩ,	±5%
R309, 310		**ERO25CKF6801**	Metal Film,	1/4W,	6.8kΩ,	±1%
R311, 312		**ERO25CKF6801**	Metal Film,	1/4W,	6.8kΩ,	±1%
R313, 314		**ERD25TJ333**	Carbon,	1/4W,	33kΩ,	±5%
R315, 316		**ERO25CKF6801**	Metal Film,	1/4W,	6.8kΩ,	±1%
R317, 318		**ERD25FJ822**	Carbon,	1/4W,	8.2kΩ,	±5%
R319, 320		**ERD25FJ152**	Carbon,	1/4W,	1.5kΩ,	±5%
R321, 322		**ERD25TJ273**	Carbon,	1/4W,	27kΩ,	±5%
R323, 324		**ERD25TJ184**	Carbon,	1/4W,	180kΩ,	±5%
R325, 326		**ERD25TJ183**	Carbon,	1/4W,	18kΩ,	±5%
R327, 328		**ERD25FJ272**	Carbon,	1/4W,	2.7kΩ,	±5%
R329, 330		**ERD25TJ394**	Carbon,	1/4W,	390kΩ,	±5%
R331, 332		**ERD25TJ393**	Carbon,	1/4W,	39kΩ,	±5%
R333, 334		**ERD25FJ472**	Carbon,	1/4W,	4.7kΩ,	±5%
R335, 336		**ERD25FJ821**	Carbon,	1/4W,	820Ω,	±5%

Ref. No.		Part No.	Part Name & Description
R337, 338		**ERD25TJ183**	Carbon, 1/4W, 18kΩ, ±5%
R339, 340		**ERD25FJ272**	Carbon, 1/4W, 2.7kΩ, ±5%
R341, 342		**ERD25FJ101**	Carbon, 1/4W, 100Ω, ±5%
R343, 344		**ERD25FJ560**	Carbon, 1/4W, 56Ω, ±5%
R345, 346		**ERD25TJ104**	Carbon, 1/4W, 100kΩ, ±5%
R347, 348		**ERD25TJ104**	Carbon, 1/4W, 100kΩ, ±5%
R349, 350		**ERO25CKF3302**	Metal Film, 1/4W, 33kΩ, ±1%
R351, 352		**ERO25CKF3302**	Metal Film, 1/4W, 33kΩ, ±1%
R353, 354		ERO25CKF2200	Metal Film, 1/4W, 220Ω, ±1%
R355, 356		ERO25CKF2200	Metal Film, 1/4W, 220Ω, ±1%
R357, 358		**ERD25TJ474**	Carbon, 1/4W, 470kΩ, ±5%
R359, 360		**ERD25FJ821**	Carbon, 1/4W, 820Ω, ±5%
R401, 402		**ERD25TJ124**	Carbon, 1/4W, 120kΩ, ±5%
R403		**ERD25TJ683**	Carbon, 1/4W, 68kΩ, ±5%
R404, 405		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ±5%
R406		**ERD25TJ333**	Carbon, 1/4W, 33kΩ, ±5%
R407		**ERD25TJ823**	Carbon, 1/4W, 82kΩ, ±5%
R408		**ERD25TJ683**	Carbon, 1/4W, 68kΩ, ±5%
R409		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ±5%
R410		**ERD25TJ333**	Carbon, 1/4W, 33kΩ, ±5%
R411		**ERD25TJ823**	Carbon, 1/4W, 82kΩ, ±5%
R412		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ±5%
R413		**ERD25FJ561**	Carbon, 1/4W, 560Ω, ±5%
R414		**ERD25TJ153**	Carbon, 1/4W, 15kΩ, ±5%
R415, 416		**ERD25TJ124**	Carbon, 1/4W, 120kΩ, ±5%
R417, 418		**ERD25FJ472**	Carbon, 1/4W, 4.7kΩ, ±5%
R419, 420		**ERD25TJ473**	Carbon, 1/4W, 47kΩ, ±5%
R421, 422		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ±5%

Ref. No.		Part No.	Part Name & Description
R423		**ERD25TJ223**	Carbon, 1/4W, 22kΩ, ±5%
R424		**ERD25TJ683**	Carbon, 1/4W, 68kΩ, ±5%
R425		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ±5%
R426		**ERD25TJ683**	Carbon, 1/4W, 68kΩ, ±5%
R427		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ±5%
R428, 429		**ERD25FJ822**	Carbon, 1/4W, 8.2kΩ, ±5%
R430		**ERD25TJ683**	Carbon, 1/4W, 68kΩ, ±5%
R431		**ERD25TJ564**	Carbon, 1/4W, 560kΩ, ±5%
R432		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ±5%
R433		**ERD25TJ683**	Carbon, 1/4W, 68kΩ, ±5%
R434		**ERD25FJ822**	Carbon, 1/4W, 8.2kΩ, ±5%
R435		**ERD25TJ333**	Carbon, 1/4W, 33kΩ, ±5%
R436		**ERD25TJ683**	Carbon, 1/4W, 68kΩ, ±5%
R437		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ±5%
R438		**ERD25TJ333**	Carbon, 1/4W 33kΩ, ±5%
R439		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ±5%
R440, 441		**ERD25FJ561**	Carbon, 1/4W, 560Ω, ±5%
R442, 443		**ERD25FJ561**	Carbon, 1/4W, 560Ω, ±5%
R444, 445		**ERD25FJ561**	Carbon, 1/4W, 560Ω, ±5%
R446, 447		**ERD25TJ823**	Carbon, 1/4W, 82kΩ, ±5%
R448		**ERD25FJ121**	Carbon, 1/4W, 120Ω, ±5%
R450		**ERD25TJ223**	Carbon, 1/4W, 22kΩ, ±5%
R501		**ERD25TJ153**	Carbon, 1/4W, 15kΩ, ±5%
R502, 503		**ERD25TJ273**	Carbon, 1/4W, 27kΩ, ±5%
R504, 505		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ±5%
R506, 507		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ±5%
R508		**ERD25TJ563**	Carbon, 1/4W, 56kΩ, ±5%
R509	⚠	ERD2FCJ8R2	Carbon, 1/4W, 8.2Ω, ±5%
R510		**ERD25FJ221**	Carbon, 1/4W, 220Ω, ±5%
R511		**ERD25FJ391**	Carbon, 1/4W, 390Ω, ±5%

Ref. No.		Part No.	Part Name & Description
R701		**ERD25TJ333**	Carbon, 1/4W, 33kΩ, ±5%
R702		**ERD25FJ682**	Carbon, 1/4W, 6.8kΩ, ±5%
R703		**ERD25TJ474**	Carbon, 1/4W, 470kΩ, ±5%
R704	⚠	**ERD50FJ102**	Carbon, 1/2W, 1kΩ, ±5%
R705		**ERD25TJ153**	Carbon, 1/4W, 15kΩ, ±5%
R706		**ERD25FJ182**	Carbon, 1/4W, 1.8kΩ, ±5%
R707		**ERD25FJ682**	Carbon, 1/4W, 6.8kΩ, ±5%
R708		**ERD25FJ332**	Carbon, 1/4W, 3.3kΩ, ±5%
R709		**ERD25TJ123**	Carbon, 1/4W, 12kΩ, ±5%
R(801, 802)x4		**ERD25TJ824**	Carbon, 1/4W, 820kΩ, ±5%
CAPACITORS			
C1	⚠	ECKDKC103PF	Ceramic, 400VAC, 0.01μF, $\pm^{100}_{0}$%
C2 [XA] only	⚠	ECKDKC103PF	Ceramic, 400VAC, 0.01μF, $\pm^{100}_{0}$%
C3		**ECKD1H103ZF**	Ceramic, 50V, 0.01μF, $\pm^{80}_{20}$%
C103, 104		**ECCD1H820K**	Ceramic, 50V, 82pF, ±10%
C105, 106		**ECQM1H392JZ**	Polyester, 50V, 0.0039μF, ±5%
C107, 108		**ECEA50Z1**	Electrolytic, 50V, 1μF
C109, 110		**ECEA0JS222**	Electrolytic, 6.3V, 2200μF
C111, 112		ECQP1473GZ	Polypropylene, 100V, 0.047μF, ±2%
C113, 114		**ECQM1H332JZ**	Polyester, 50V, 0.0033μF, ±5%
C115, 116		ECQP1103GZ	Polypropylene, 100V, 0.01μF, ±2%
C117, 118	⚠	ECEA1EN3R3S	Non-Polar Electrolytic, 25V, 3.3μF,
C119, 120		**ECQM1H332JZ**	Polyester, 50V, 0.0033μF, ±5%
C121		**ECEA1VS330**	Electrolytic, 35V, 33μF
C122		**ECEA1ES101**	Electrolytic, 25V, 100μF
C201, 202		**ECQM1H153JZ**	Polyester, 50V, 0.015μF, ±5%

Ref. No.		Part No.	Part Name & Description
C203, 204		**ECCD1H101K**	Ceramic, 50V, 100pF, ±10%
C205		**ECEA1VS330**	Electrolytic, 35V, 33μF
C301, 302		ECQE1683KN	Polyester, 125V, 0.068μF, ±10%
C303, 304		ECQE1333KN	Polyester, 125V, 0.033μF, ±10%
C305, 306		**ECCD1H331KB**	Ceramic, 50V, 330pF, ±10%
C307, 308		**ECEA50M1R**	Electrolytic, 50V, 1μF
C309, 310		**ECCD1H330K**	Ceramic, 50V, 33pF, ±10%
C311, 312	⚠	ECEA1EN3R3S	Non-Polar Electrolytic, 25V, 3.3μF
C313, 314		**ECQM1H183JZ**	Polyester, 50V, 0.018μF, ±5%
C315, 316		ECQE1104KN	Polyester, 125V, 0.1μF, ±10%
C317, 318		**ECQM1H392JZ**	Polyester, 50V, 0.0039μF, ±5%
C319, 320		ECQE1393KN	Polyester, 125V, 0.039μF, ±10%
C321, 322		**ECEA1VS330**	Electrolytic, 35V, 33μF
C323, 324		**ECQM1H222JZ**	Polyester, 50V, 0.0022μF, ±5%
C325, 326	⚠	ECEA1EN3R3S	Non-Polar Electrolytic, 25V, 3.3μF
C327, 328		**ECKD1H821KB**	Ceramic, 50V, 820pF, ±10%
C330		**ECKD1H102ZF**	Ceramic, 50V, 0.001μF, $\pm^{80}_{20}$%
C331, 332		**ECCD1H470K**	Ceramic, 50V, 47pF, ±10%
C401, 402		**ECKD1H103ZF**	Ceramic, 50V, 0.01μF, $\pm^{80}_{20}$%
C403		**ECKD1H103ZF**	Ceramic, 50V, 0.01μF, $\pm^{80}_{20}$%
C404		**ECEA1CS222**	Electrolytic, 16V, 2200μF
C405		**ECEA1CS330**	Electrolytic, 16V, 33μF
C406		**ECEA1AS470**	Electrolytic, 10V, 47μF
C407, 408		**ECKD1H103ZF**	Ceramic, 50V, 0.01μF, $\pm^{80}_{20}$%
C409, 410		**ECEA50MR47R**	Electrolytic, 50V, 0.47μF
C411		**ECEA1CS102**	Electrolytic, 16V, 1000μF
C412, 413		**ECEA1AS101**	Electrolytic, 10V, 100μF
C414, 415		**ECEA1AS101**	Electrolytic, 10V, 100μF

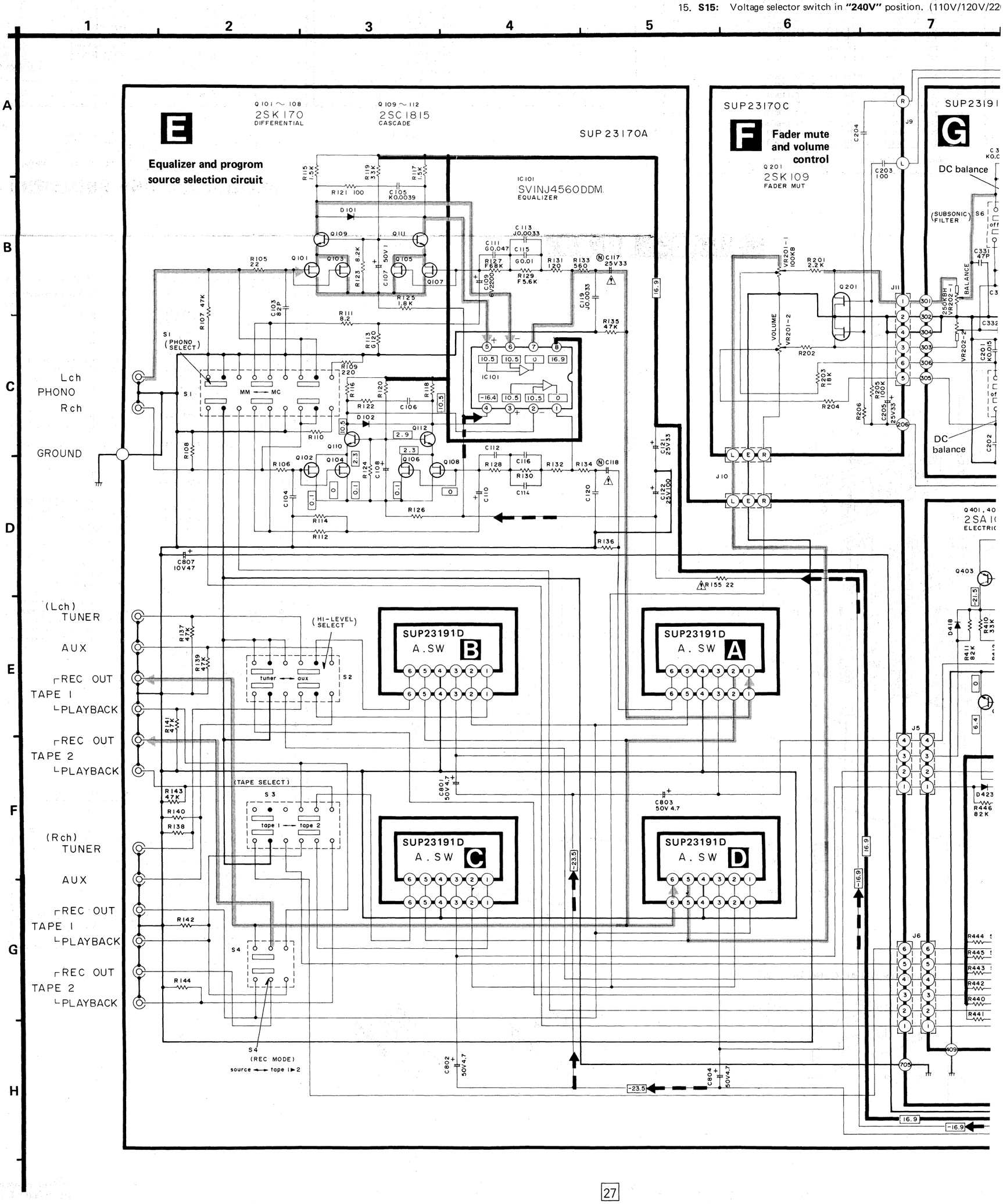
Ref. No.		Part No.	Part Name & Description			
C416		**ECKD1H103ZF**	Ceramic,	50V,	0.01μF,	$\pm^{80}_{20}$%
C418		**ECEA1HS100**	Electrolytic,	50V,	10μF,	
C501		**ECEA50Z1**	Electrolytic,	50V,	1μF,	
C502		**ECKD1H103ZF**	Ceramic,	50V,	0.01μF,	$\pm^{80}_{20}$%
C503		**ECEA1CS330**	Electrolytic,	16V,	33μF	
C504		**ECKD1H103ZF**	Ceramic,	50V,	0.01μF,	$\pm^{80}_{20}$%
C505		**ECEA1AS470**	Electrolytic,	10V,	47μF	
C701, 702		**ECEA1VS102**	Electrolytic,	35V,	1000μF,	
C703, 704		**ECEA1VS330**	Electrolytic,	35V,	33μF	
C705		**ECEA1ES101**	Electrolytic,	25V,	100μF	
C706		**ECEA1HS100**	Electrolytic,	50V,	10μF	
C707, 708		**ECEA1ES101**	Electrolytic,	25V,	100μF	
C709		**ECEA1CS222**	Electrolytic,	16V,	2200μF	
C710		**ECEA1CS330**	Electrolytic,	16V,	33μF	
C711		**ECEA1AS221**	Electrolytic,	10V,	220μF	
C712		**ECEA50Z3R3**	Electrolytic,	50V,	3.3μF	
C713		**ECEA1AS221**	Electrolytic,	10V,	220μF	
C714		**ECKD1H102KB**	Ceramic,	50V,	0.001μF,	±10%
C716		**ECEA1ES470**	Electrolytic,	25V,	47μF	
C801, 802		**ECEA50Z4R7**	Electrolytic,	50V,	4.7μF	
C803, 804		**ECEA50Z4R7**	Electrolytic,	50V,	4.7μF	
C(805, 806)x4		**ECKD1H102KB**	Ceramic,	50V,	0.001μF,	±10%
C807		**ECEA1AS470**	Electrolytic,	10V,	47μF	
C808		**ECEA1AS101**	Electrolytic,	10V,	100μF	

■ SCHEMATIC DIAGRAM ····· MODEL **SU-A8**

(This schematic diagram may be modified at any time with the development of new technology.)

Notes:

1. **S1:** Phono cartridge (MM/MC) selector switch in "**MM**" position.
2. **S2:** Hi-level (tuner/aux) selector switch in "**tuner**" position.
3. **S3:** Tape (tape 1/tape 2) selector switch in "**tape 1**" position.
4. **S4:** Recording mode (source/tape dubbing 1 ▶ 2) selector switch in
5. **S5:** Loudness switch in "**off**" position.
6. **S6:** Subsonic filter switch in "**off**" position.
7. **S7:** Operation (straight DC/via tone) selector switch in "**straight D**
8. **S8:** Fader switch (toggle on/off)
9. **S9:** Input selector "**phono**" switch.
10. **S10:** Input selector "**hi-level**" switch.
11. **S11:** Tape monitor switch. (toggle source/monitor)
12. **S12:** Tone control box "**open/close**" switch.
13. **S13:** Motor control switch in "**off**" position.
14. **S14:** Power source switch in "**on**" position.
15. **S15:** Voltage selector switch in "**240V**" position. (110V/120V/22



) selector switch in **"MM"** position.
tor switch in **"tuner"** position.
ctor switch in **"tape 1"** position.
(tape dubbing 1 ▶ 2) selector switch in **"source"** position.
position.
"off" position.
(a tone) selector switch in **"straight DC"** position.
off)
switch.
switch.
ggle source/monitor)
"close" switch.
"off" position.
on" position.
n **"240V"** position. (110V/120V/220V/240V)

16. Same circuit is used for both L (left) and R (right) channels. For the resistance and capacity of R channel (lower of schematic diagram), refer to L channel. For the voltage value, refer to R channel.
17. ▭ Indicated voltage value are the standard values for the DC electronic circuit tester with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
18. The value in ( ) is of voltage when electronic switch circuit is OFF.
19. The terminal voltage of IC shown by ▨ is H (+Vcc) or L (0V) depending upon the switch position selected. (Refer to Technical Guide).
20. The circuits and printed circuit board used for electronic switches **A**, **B**, **C** and **D** are identical to one another.
21. Phono signal lines of left channel.
22. Positive (+B) voltage lines.
23. Negative (—B) voltage lines.
24. Important safety notice:
Componetns identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

7 8 9 10 11 12 13

SUP23191A **Tone control circuit**

Q301, 302 SVI μPA68HA DIFFERENTIAL
Q303 ~ 306 2SC1815 CASCAD
IC301 SVINJ4560DDM TONE AMP

DC balance
(SUBSONIC) FILTER S6
(LOUDNESS) S5
BALANCE
DC balance
BASS TREBLE
VIA TONE D503
SUP23191C
SUP23170B
(OPERATION) S7 DC via tone

Q401, 403, 405, 406, 408 ~ 410 2SA1015 ELECTRIC SWITCH DRIVER
Q402, 404, 407, 411 2SC1815 LAMP DRIVER
IC401 SVITC4011BP NAND GATE
IC 403 SVITC4027BP JK FLIP FLOP
IC402 SVITC4001BP NOR GATE
Q501 2SC1815 ONE SHOT MULTI
Q503 2SD836 SWITCHING

(TAPE MONITOR) S11
S10 (HI-LEVEL) SUP23170E
S9 (PHONO) SUP23170F
(FADER) S8
(T. C. UNIT) S12
tape monitor PL4
hi-level PL3
phono PL2
fader PL1
volume indicator PL5 PL6 PL7 PL8
tape 1 tape 2 tuner aux MM MC
SUP23170D
PL1 ~ 4 (6V 70mA) PL5 ~ 8 (14V 50mA)

channel (lower of schematic

assis taken as standard. There-
DC circuit tester.

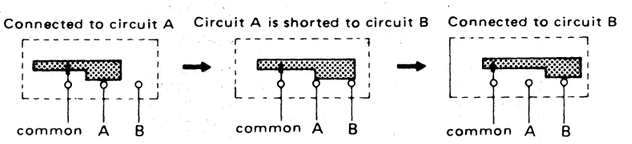
ch position selected. (Refer to

to one another.

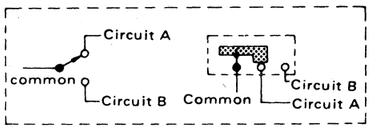
eplacing any of these com-

• Shorting Switch

This unit uses a horting switch. As illustated below, the circuit is shorted to the next circuit without being opened.
In the circuit diagram, the shaded area represents the common terminal.

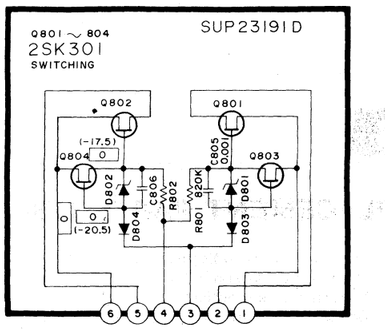


An example of circuit diagram



12 13 14 15 16 17 18

A ~ D Electronic switch



E Regulator and relay circuit

Q701, 702, 706 — 2SK246 — REGULATOR
Q703 — 2SD836 — REGULATOR
Q704 — 2SB750 — REGULATOR
Q705 — 2SA1015 — REGULATOR & FADER SWITCHING
Q707 — 2SC1983 — REGULATOR
Q708 ~ 710 — 2SC1815 — RELAY DRIVE & SWITCHING

H

SUP23170B

VIA TONE
320
D503
321
SUP23191C

J9 L E R
J12 1 2 3 4
J13 5 4 3 2 1
J14 8 7 6 5 4 3 2 1
J8 L E R
J4 8 7 6 5 4 3 2 1

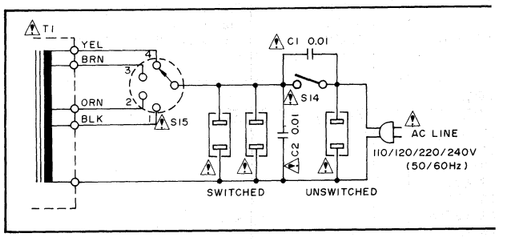
C3 0.01
(MOTOR CONTROL)
S13
D502
C505 10V47
R509 8.2
16.9
C808 6V100
R337 1.8K
(OPERATION) S7
DC
via tone
C311 25V3.3
R339 2.7K
R510 220
R511 390
R340
R338
C312
C323 R341 0.0022 100
C324 R342
R343 56
L301
RLY 1
L302
R344
R345 100K
C325 25V3.3
R346
C326
R347 100K
R348
OUTPUT
Lch DC
Rch
Lch NORMAL
Rch
R706 1.8K
R704 1K
D706
R705 15K
Q709
Q710
Q711
R703 470K
R701 33K
R707 6.8K
Q708
C712 50V3.3
C713 6V220
C714 0.001
D705
R702 6.8K
Q707
Q706
C711 10V220
C702 16V2200
C710 16V33
D704
6.4
10.3
7.0
16.9
Q703
27.0
Q701
18.0
D701
C705 25V100
C703 25V33
C701 35V1000
C707 25V100
C706 25V10
D703
C716 25V47
C704 25V33
D702
C708 25V100
R709 12K
R708 3.3K
Q702
Q705
Q704
D715
-23.5
-24.1
-18.0
-16.9
-27.8
10.3
27.0
704
J7 1 2 3 4 5 6
J1 1 2 3 4 5 6
D422 D421
D413
R424 68K
D414
R426 68K
IC 403 SVITC4027BP
JK FLIP FLOP
PR J K CL Cp Q Q
C416 0.01
R423 22K
D415 D416
R415 100K
C407 0.01
R421 10K
R419 47K
R420 47K
R417 4.7K
C409 50V0.47
IC402
C408 0.01
R416 120K
R418 4.7K
C410 50V0.47
R422 10K
IC402 SVITC4001BP
NOR GATE
C502 0.01
C504 0.01
R503 27K
R504 10K
Q502
Q503
R508 56K
R501 15K
C501 50V1
R507 10K
Q501
R505 10K
R506 10K
C503 10V33
R502 27K
0501
Q501 2SC1815 ONE SHOT MULTI
Q502 2SA1015 ONE SHOT MULTI
Q503 2SD836 SWITCHING
408
16.9
-23.5

• Part number of diodes

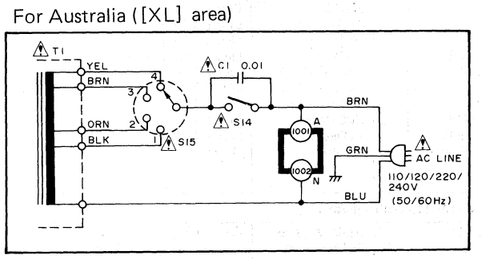
Ref No.	Part No.	Ref No.	Part No.
D101, 102	MA150	D503	LN424YP
D301 ~ 304	MA150	D601 ~ 606	LN217RP
D401 ~ 407	MA150	D701, 702	SVDMZ318A2
D408	SVDMZ312	D703	SVDMZ324A2
D409 ~ 411	MA150	D704	SVDMZ307
D412	0A90	D705, 706	MA150
D413 ~ 418	MA150	D707 ~ 714	SVDSRIK2
D419	SVDMZ304	D715	MA150
D420 ~ 424	MA150	D801, 802	SVDMZ304
D501, 502	MA150	D803, 804	MA150

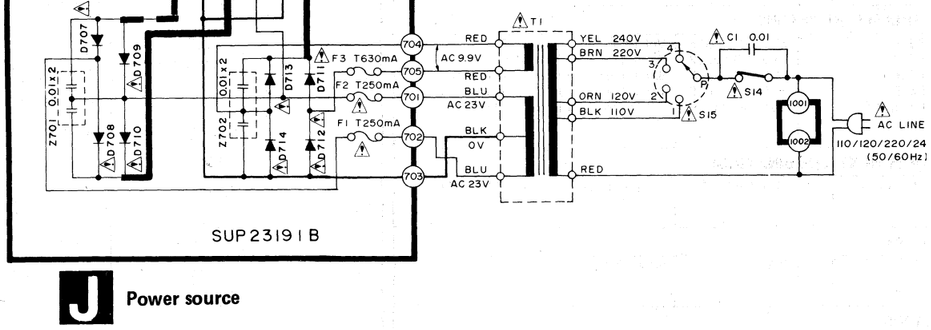
• Power source circuit

For Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
([XA] area)



For Australia ([XL] area)





J Power source

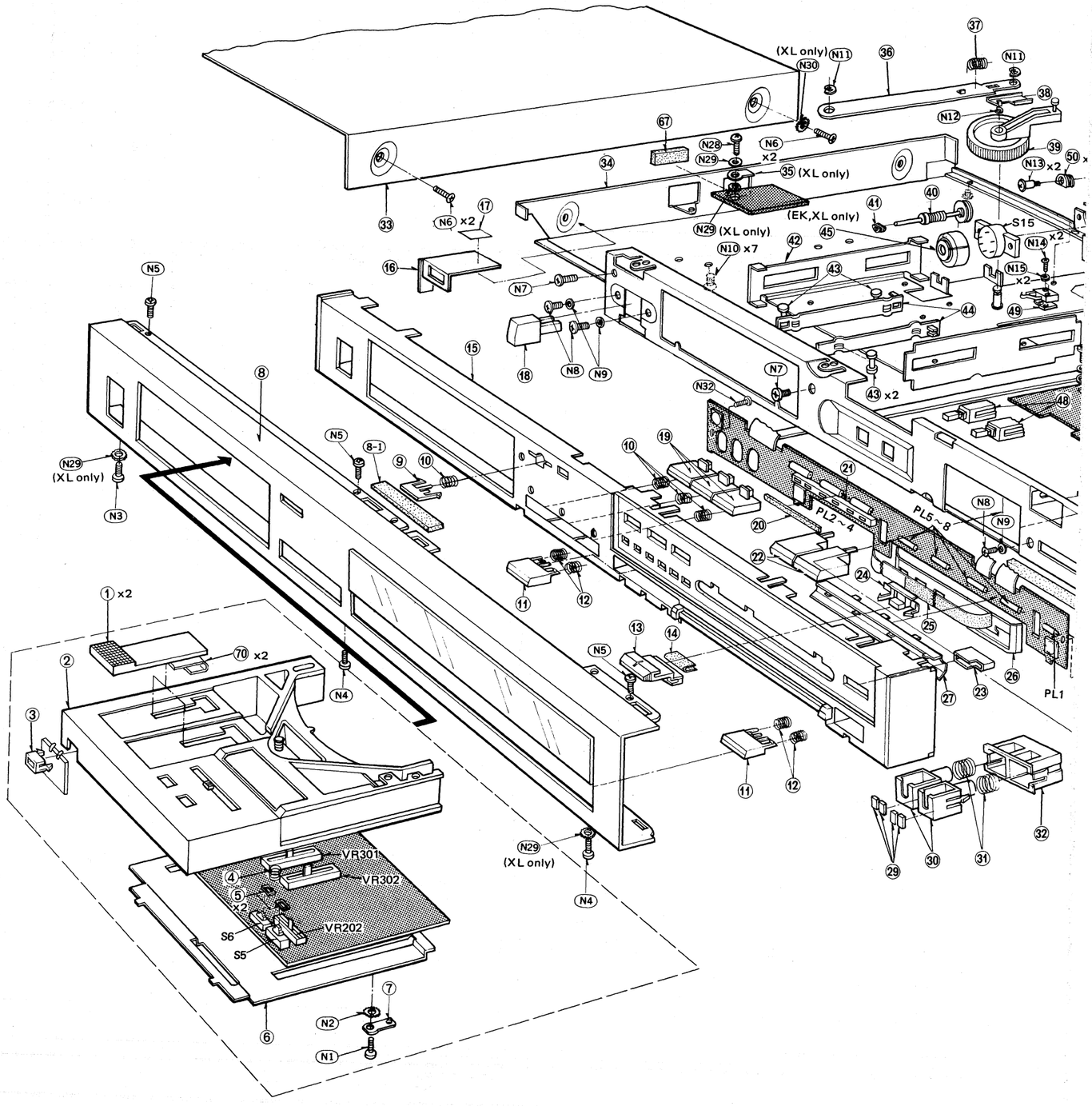
■ REPLACEMENT PARTS LIST

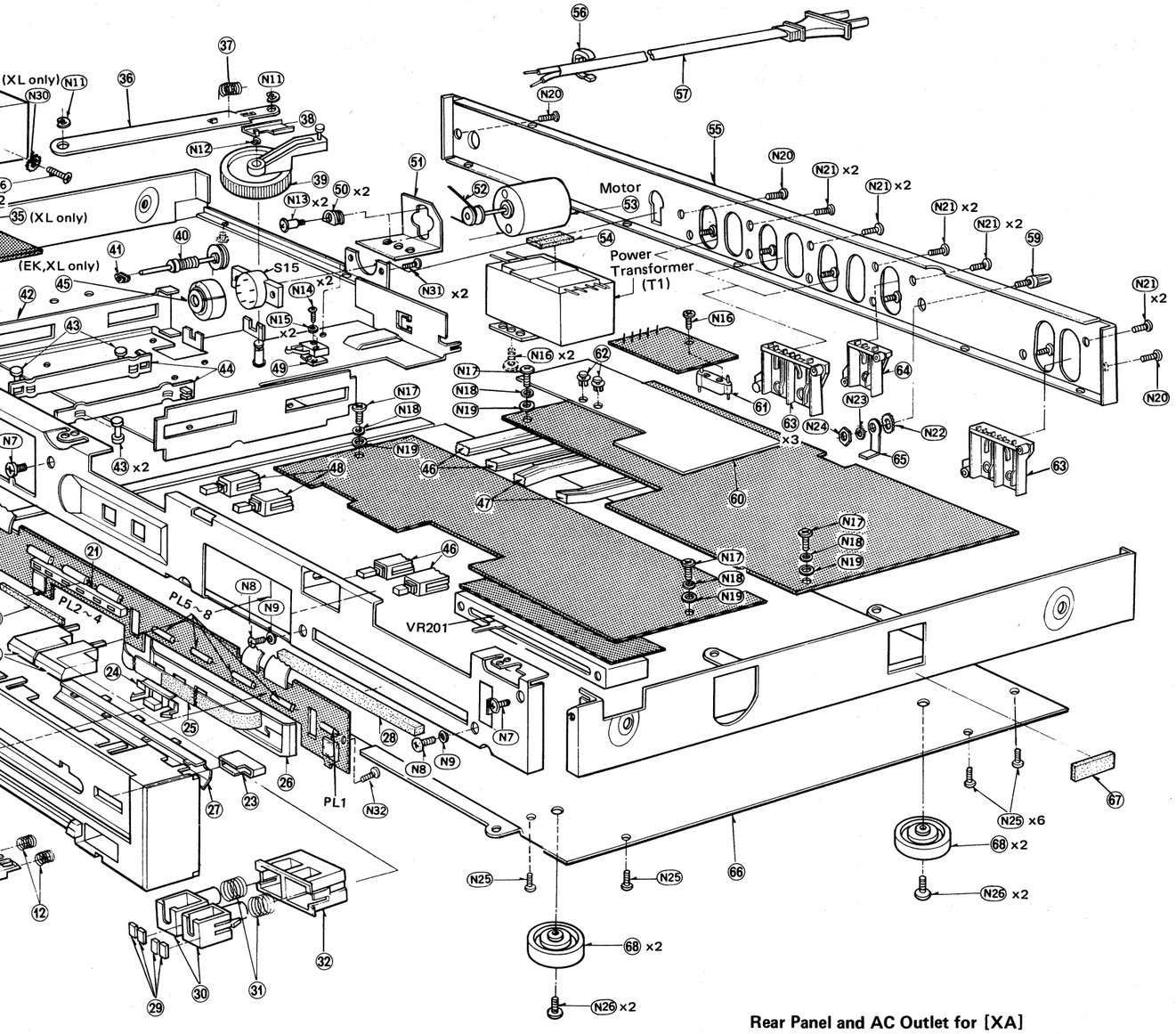
Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

Ref. No.		Part No.	Part Name & Description
INTEGRATED CIRCUITS			
IC101, 301		SVINJ4560DDM	IC, Equalizer, Tone Amplifier
IC401		SVITC4011BP	IC, NAND Gate
IC402		SVITC4001BP	IC, NOR Gate
IC403		SVITC4027BP	IC, JK Flip Flop
TRANSISTORS			
Q101~108		2SK170–GR	Transistor, Differential Amp. [FET]
Q109~112		2SC1815–Y	Transistor, Cascade, Lamp & Relay Drive, One Shot Multi
402, 404, 407			
411, 501, 708			
709, 710			
Q201		2SK109–D	Transistor, Fader Muting [FET]
Q301, 302		SVIUPA68HA	Transistor, Differnetial Amp. [FET]
Q303~306		2SC1815–Y	Transistor, Cascad
Q401, 403, 405		2SA1015–Y	Transistor, Switching, One Shot Multi &
406, 408, 409			Regulator
410, 502, 705,			
711			
Q503, 703		2SD836–Q	Transistor, Switching & Regulator
Q701, 702, 706		2SK246–Y	Transistor, Regulator [FET]
Q704		2SB750–R	Transistor, Regulator
Q707		2SC1983	Transistor, Regulator
Q(801~804)x4		2SK301–S	Transistor, Switching [FET]
DIODES			
D101, 102,		**MA162A**	Diode, Switching
301~304,			
401~407,			
409~411,			
413~418,			
420~424,			
501,502,705,			
706, 715			
D408		SVDMZ312	Diode, 12V Zener
D412		**20A90**	Diode
D419		SVDMZ304	Diode, 4V Zener
D503		LN424YP	Light Emiting Diode, Yellow
D601~606		LN217RP	Light Emiting Diode, Red
D701, 702		SVDMZ318A2	Diode, 18V Zener
D703		SVDMZ324A2	Diode, 24V Zener
D704		SVDMZ307B	Diode, 7V Zener
D707~714	⚠	**SVDSR1K2**	Rectifier
D(801, 802)x4		**SVDMZ304B**	Diode, 4V Zener
D(803, 804)x4		**MA162A**	Diode
COILS and TRANSFORMER			
L301, 302		**RLQX1013–D**	Coil, Choke
T1	⚠	SLT5J159–W	Transformer, Power Source
VARIABLE RESISTORS			
VR201		EVBJG1C16B15	Volume Control, 100kΩ (B)
VR202		EVBK08C06252	Balance Control , 250kΩ (BH)
VR301		EVBJF1C06530	Bass Control , 100kΩ (C) (center short)
VR302		EVBK07C06C15	Treble Control, 100kΩ (C) (center open)
VR303, 304		EVMHIGA00B53	DC Balance Adjustment, 5kΩ (B)
COMPONENT COMBINATIONS			
Z701, 702		SXRFS203ZSM	Component Combination, 0.01μF (x2)
RELAY			
RLY1		SSY9	Relay, Output Muting
LAMPS			
PL1~4	⚠	XAMR95Q23	Lamp, Input Select Indicator, 70mA (6V)
PL5~8	⚠	XAMR85S15	Lamp, Volume Indicator, 50mA (14V)

Ref. No.		Part No.	Part Name & Description
SWITCHES			
S1		SSH1015	Switch, Phono Selector (MM ↔ MC)
S2, 7		SSH1017	Switch, Hi-Level Selector, Operation
S3, 4		SSH2025	Switch, Tape Selector, Rec Mode
S5, 6		SSS61	Switch, Loudnees, Subsonic Filetr
S8 ~ 12		SSG9	Switch, Fader, Input, Tape Monitor and Tone Control
S13		SSE33	Switch, Motor Control (Micro Switch)
S14	⚠	ESB90259S	Switch, Power Source
S15	⚠	ESE3787	Switch, Voltage Adjust
FUSES			
F1, 2	⚠	XBA2C025TRO	Fuse, T250mA (250V)
F3	⚠	XBA2C06TR0	Fuse, T630mA (250V)
CABINET and CHASSIS PARTS			
1		SBD39–1	Button, Bass, Treble Control
2		SYEUA8KM–1	Panel Ass'y
3		SMP313	Holder, LED
4		SUS253	Spring
5		SHR5139–1	Spacer, Switch (S5.6)
6		SKUUA8KM–1	Bottom Cover
7		SJT231	Terminal
8		SGWUA8KE	Front Panel Ass'y
8–1		[SHG6063–1]	Spacer, Front Panel Ass'y
9		SBC415	Button, Open/Close
10		SUS207	Spring, Button
11		SBC417–1	Button, Tape and Fader Switch
12		SUS209	Spring, Button
13		SBD43	Knob, Volume Control
14		SHR5149	Spacer, Knob
15		SGXUA8KE	Front Sub Panel Ass'y
16		SMX537	Shield Cover
17		SMX265	Spacer, Shield Cover
18		SBC337	Button, Power Switch
19		SBC413	Button, Operation, Rec Mode and Tape Selector
20		SHS3149–1	Sheet
21		SMP315	Holder, LED
22		SBC419–1	Button, Hi-Level and Phono Selector Switch
23		SHP9361	Spacer, Lamp
24		SHR9565–1	Slider, Film
25		SDU91	Film, Volume Control
26		SUM31	Bracket, Film
27		SMZ303	Reflector Plate
28		SHG6209	Spacer
29		SHG6207	Spacer, Button
30		SHR9561–1	Slider
31		SUS245	Spring, Slider
32		SHR9563–1	Case, Slider
33		SKC710B	Cabinet Cover
34		SUA2810–1	Bottom Cover
35[XL] only		RJT202B	Terminal
36		SUB77	Link Rod
37		RDS4090A	Spring, Operation Lever
38		SUB79	Bracket, Operation Lever
39		SDG9003	Gear, Operation
40		SFUMCUA8KM	Cam Ass'y
41		SFUM172–52	Rubber, Cam Ass'y
42		SXE971–2	Bracket, Bottom Plate
43		SDR27	Roller
44		SHR9567	Slider
45[EK,XL] only		SUV473	Cover, Voltage Adjust Switch
46		SUB69	Coupling Rod
47		SUB71	Coupling Rod
48		SUB73	Coupling Rod
49		SMX519	Spacer, Micro Switch
50		SHG6183	Rubber Spacer, Motor
51		SMN1797	Bracket, Motor Holder
52		SFGBC10–01	Belt

■ EXPLODED VIEWS





Rear Panel and AC Outlet for [XA]

Ref. No.		Part No.	Part Name & Description
53		SJG1	Motor
54		SHG6025	Rubber
55		SGP2831A	Rear Panel
55[XA] only		SGP2831–1A	Rear Panel
55[XL] only		SGP2831–2A	Rear Panel
56		SHR127	Bushing, AC Cord
56[EK] only		SHR129	Bushing, AC Cord
56[XL] only		SHR131	Bushing, AC Cord
57	⚠	**SJA88**	AC Cord
57[EK] only	⚠	**QFC1205M**	AC Cord
57[XA] only	⚠	SJA111	AC Cord
57[XL] only	⚠	**QFC1207MA**	AC Cord
58[XA] only	⚠	SJS9221	Socket, AC Outlet
59		SJF4101	Terminal, GND
60		SMX529–1	Shield Cover, PCB
61		SHE73	Spacer, PCB
62		SHR401–1	Lock Pin, Shield Cover
63		SJF3431–4N	Terminal Board, Phono
64		SJF3225–2A	Terminal Board
65		SJT233	Terminal
66		SKUUA8KE	Bottom Board
66[E] only		SKUUA8KB	Bottom Board
66[XA,XL] only		SKUUA8KX	Bottom Board
67		SHG6143–1	Rubber
68		SKL273	Foot
69		SHR301	Lead Clamper
70		SHR5159	Spacer, Knob

SCREWS, WASHERS, NUTS and RETAINING RINGS

N1		**XTB3+8BFZ**	Screw, Tapping ⊕ 3x8
N2		**XWC3B**	Washer, External Toothed Lock ϕ3
N3		**XTB3+8BFZ**	Screw, Tapping ⊕ 3x8
N4		**XTB3+8BFN**	Screw, Tapping ⊕ 3x8
N5		**XTS3+8BFN**	Screw, Tapping ⊕ 3x8
N6		**XTB4+8BFZ**	Screw, Tapping ⊕ 4x8
N7		**XTB3+8BFZ**	Screw, Tapping ⊕ 3x8
N8		**XSN3+6S**	Screw, ⊕ 3x6
N9		**XWA3B**	Washer, Spring ϕ3
N10		**XTB3+8BFZ**	Screw, Tapping ⊕ 3x8
N11		**XUC3FT**	Retaining Ring, ϕ3 (Type E)
N12		**XUC5FT**	Retaining Ring, ϕ5 (Type E)
N13		SHD3x21F–1	Screw
N14		**XSN2+10**	Screw ⊕ 2x10
N15		**XWA2B**	Washer, Spring ϕ2
N16		**XTB3+8BFZ**	Screw, Tapping ⊕ 3x8
N17		**XSN3+8BNS**	Screw ⊕ 3x8
N18		**XWA3BFN**	Washer, Spring ϕ3
N19		**XWG4FN**	Washer, Plain ϕ4
N20		XTBS3+8BFZ1	Screw, Tapping with Detent ⊕ 3x8
N21		**XTB3+8BFZ**	Screw, Tapping ⊕ 3x8
N22		**XWC6B**	Washer, External Toothed Lock ϕ6
N23		**XWA6B**	Washer, Spring ϕ6
N24		**XNS6E**	Nut, ϕ6
N25		**XTB3+8BFN**	Screw, Tapping ⊕ 3x8
N25 [XL] only		XTBS3+8BFZ1	Screw, Tapping with Detent ⊕ 3x8
N26		**XTB3+8BFZ**	Screw, Tapping ⊕ 3x8
N28		**XTB3+8BFZ**	Screw, Tapping ⊕ 3x8
N28 [XL] only		**XSN3+8BFZ**	Screw, ⊕ 3x8
N29[XL] only		**XWC3B**	Washer, External Toothed Lock ϕ3
N30[XL] only		**XWC4BVW**	Washer, External Toothed Lock ϕ4
N31		**XTB3+10BFZ**	Screw, Tapping ⊕ 3x10
N32		**XTB3+8B**	Screw, Tapping ⊕ 3x8

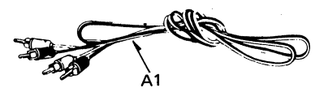
ACCESSORIES

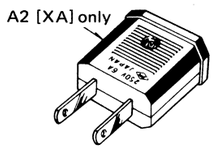
A1		SJP2129–5	Cord, Connection
A2[XA] only	⚠	SJP5213–1	Plug Adapter, AC Power
A3[XA] only	⚠	SJP5215	Plug Adapter, AC Power
A4		SQF10975	Instructions Book, Printed Matter
A4[XA] only		SQF10977	Instructions Book, Printed Matter
A4[EK,XL] only		SQF10979	Instructions Book, Printed Matter
A4[Ei] only		SQF11101–3	Instructions Book, Printed Matter
A4[EG] only		SQF11081	Instructions Book, Printed Matter

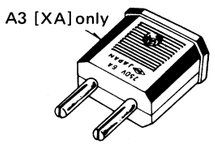
PACKING PARTS

P1		SPP649	Polyethylene Bag
P2		SPS3321	Pad, Left Side
P2[XL] only		SPS3321–1	Pad, Left Side
P3		SPS3323	Pad, Right Side
P3[XL] only		SPS3323–1	Pad, Right Side
P4		SPG3321	Carton Box
P4[EF] only		SPG3323	Carton Box
P4[XL] only		SPG3331	Carton Box
P5		SPS3469	Pad, Tone Control Box

• Accessories







Areas

* [E] is available in Scandinavia and Switzerland.
* [EG] is available in F.R. Germany.
* [EK] is available in United Kingdom.
* [EF] is available in France.
* [EH] is available in Holland.
* [EB] is available in Belgium.
* [Ei] is available in Italy.
* [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
* [XL] is available in Australia.

Printed in Japan
81099000 ® KK/TN